

Experts Advisors - mechanical trading systems on MetaQuotes Language II

The trader makes a decision on an input in the market (or closing of a position) in case of observance of the certain conditions, i.e. adheres to the certain algorithm at opening and closing of positions. Such algorithm usually name **trading tactics** (Expert Advisors). Usually they are written and tested in such known analytical packages as MetaStock or TradeStation. But how to connect trading tactics with the real account? To connect so that it is direct from expert system to know and operate at any moment the open positions exposed by warrants and stops... Whether Probably such? Yes, such it is possible in MetaTrader.

What the counselor or **Expert Advisor** represents? It is the mechanical trading system (MTS) written in specialized language MetaQuotes Language (MQL) II and having a binding to the certain schedule. The counselor can work not only in a mode of informing on an opportunity to make the transaction, but can automatically make also transactions on trading to the account, directing orders directly on a trading server. The code of the counselor can be closed from "extraneous eyes" by the password. Expert Advisors support testing strategy for the historical data with display on schedules of a point of opening / closing of a position.

Training MQL II

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The Lesson # 1

1.1 From the author

Hello, dear readers! My name is Halhaljan Arthur, I am the author of project [Fxtest.ru](#), we professionally are engaged in development and realization of mechanical trading systems. I, probably, am better than others I know, as far as, this heading, since 90 % of our orders, it just experts on MQL II under much known terminal Meta Trader (further I **bude** to name it **MT**) is necessary for traders. I shall not result here comparative tables and characteristics, but in my personal opinion **MT** for today is the most successful domestic terminal, for trade on [Forex](#) and [CFD](#). As, only it has the built - in environment of programming. That **MT** many our and use some western **dilingovye** the centers is important also. For the sake of justice, it is necessary to notice, that **MT** has a number of restrictions and defects, and his ideal terminal to name difficultly, but we shall hope for his further improvement by developers.

Concerning mechanical trade already there was a uncountable quantity of disputes, I think, there is no sense to press in polemic. For a question this almost rhetorical, and trading strategy and a way of its realization, the private affair of everyone. But I am deeply confident, that the opportunity a writing of experts is useful to any trader. With help MQL it is possible not only to create experts for trade, this Wednesday programming opens enough ample opportunities. The writing of own indicators, gathering of the statistical information from the historical data, the every possible assistants, notifying a sound signal about those or others changes in the market, all this will be to you under force.

Now the computer became an integral part of many technological processes. It is especially actual for problems of great volumes the digital information connected to processing with what we and collide at a stock exchange. All know, that at a stock exchange those players who "are much stronger" than the majority win only. Certainly, in a word some parameters are "more strongly included, and one of important is technical maintenance of the trader.

Summing up, I want to tell. These lessons will be useful to all traders using a technical expertise in trade, and wishing to expand the opportunities.

1.2 Creation of the first expert

For creation of the first expert it is feasible the following:

1. We shall start **MT**.

2. In the dropping out menu "**Service**", we shall click on "**Editor MetaQuotes Language**", or we shall press **F4**.
3. Before you the environment of programming " Meta Editor ".
4. On panels of tools or from the menu "**File**" press an icon "**New**", also it is possible to use **Ctrl+N**.
5. In the appeared menu choose "**Expert Advisor Program**".
6. In the following menu, under the order enter: the name, the author, the reference, the note, quantity **lotov**("Lots"), **stoploss**(" Stop Loss "), **tejkprofit**(" Take profit ") and **trejlingstop**(" Trailing Stop ").
7. We shall press "**Further**" and "**is ready**".
8. On the screen we shall see the beginning of a code of our expert:

```

/*[[
Name: = Expert1
Author: = Your name
Link: = http: // your.website
Lots: = 1.00
Stop Loss: = 30
Take Profit: = 60
Trailing Stop: = 20
]]*/

```

All data which have been entered at creation of the expert, were displayed in the beginning("cap") of his code. At desire you can change any value. Variables: "**Lots**", "**Stop Loss**" (in a code of the expert, further " Stop Loss " it is written without a blank as well both following variables), "**Take Profit**" and "**Trailing Stop**" are registered variables MQL and will directly participate in work of the expert. From a tester which is directly in **MT**, these variables can be changed, entered at creation of the expert of value will be values **poumolchaniju**.

9. Further go section: "**defines**", "**array**" and "**var**". Behind them there is a body of the expert.
10. Add to the expert the following block:

```

defines: per1(0);
Array: ArrayName[1..3](0);
var: per2(0);

```

In section "**defines**" external variables which values can be changed in a tester are described. In section "**Array**", files, and section "**var**" are described is necessary for the description of internal variables, the expert. After the name of section the colon is put, then go the name of variables, after the name in brackets value of a variable by default (at us variables are by default equal 0) is underlined, after the termination of the description

of any section the semicolon is put. In section of files, after the name of a file in square brackets there is his dimension. In our case it is an one-dimensional file from 30 elements, value of each element by default equally 0. **per1** and **per2** are names of variables, **ArrayName** - the name of a file. We shall discuss detailed rules of the description of variables at the following lesson.

11. After these three **seksy** there is "body" of the expert. It is necessary to note, that any of **seksy** can not be, also can not be and any of **seksy**. The body of the expert can be made between operators **begin... end;**, and can be between braces **{...};**, choose.
12. By tradition which has developed at studying programming languages, we shall deduce on the screen a word "Privet", or any another. In MQL there are some functions for a conclusion of the text, we shall take advantage of function **Comment**.
13. We shall add to the text of the program this function in braces.

```
{  
Comment("Privet");  
};
```

After function we finish. The deduced word should be in double inverted commas and parentheses.

14. We receive the text of the program:

```
/*[[  
Name: = Expert1  
Author: = your name  
Link: = http: // your.website  
Lots: = 1.00  
Stop Loss: = 30  
Take Profit: = 60  
Trailing Stop: = 20  
]]*/  
  
defines: per1(0);  
Array: ArrayName[1..3](0);  
var: per2(0);  
  
{  
Comment("Privet");  
};
```

15. We click on **F7** or on an icon with a tick on the panel of problems for compilation of our expert.
16. We come in **MT**, in "navigator"(**Ctrl+N**) in **vkladke** "Counselors", we find our expert. We click on it 2 times a mousy, we agree to attach it to the schedule.

In the appeared window it is chosen **vkladku** " Testing of strategy ". In this window in a

right top corner we choose model of testing " **OHLC point(fast)** " and we press **button " Start "**.

17. On the termination of testing in the left top corner of a window with bars it is seen our word "Privet."

In [the following lesson](#) we shall study lexicon of language MQL II. In more details

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The original of clause - [FOREX MAGAZINE ? 1 from 02.02.2004](#)

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The Lesson # 2

Hello, dear readers. Today we shall in details disassemble types of variables, we shall get acquainted to operators of giving and the instruction **if - then**.

2.1 Variables of numerical type

Variables as you know, are necessary for storage of any information, with an opportunity at any moment to it to address or change her. Variables of numerical type, on logic store numbers.

```
var: K(0), N(0); // Internal variables K and N, poumolchaniju
// their values it is equal 0.
// These are variables of numerical type since on
// to default they are equal to the specified number
// the termination of the description of variables, as well as
// any other instruction MQL
// finishes ";" . If you have noticed before
// each line there is a double slash // so one-line comments
/* are designated is already usual, polnoostrochnyj the comment */

{
K=1;
// giving is carried out usual is familiar
// equality "="

N=10*2;
// in the right part can be written down mathematical
// expressions with four the basic mathematical // actions +,-,*,/

K=N+5;
N =(bid+ask)/2;
K=K+10;
/* Matematcheski expression is not true, since the right part is not equal
left. Practically in any programming language, switching MQL, such operation
of giving is absolutely normal. After that expressions variable K will
increase on 10. For the best understanding of this moment, can consider, that
up to an equal-sign there is a new value of a variable(which we want to
receive), and after old value. I.e. K=K+10, new value K is equal old plus 10.
*/
};
```

You can copy the text in Meta Editor, from a word **var** up to a closing brace together with descriptions, **t.k** all of them **zakomentirovany**.

2.2 Variables of line type

```
var: string1("text"), string2(" toge text "), string3(" ");
// variables of line type since poumolchaniju are equal to a text line
```

```
// the name of a variable can to comprise figures, but the name of a variable
// cannot begin with figure

{
string3 = "slovo";
string3=string1+string2;
/* For work with text lines there is only one line operator, the variable
string3 is designated "+", will be equal " text toge text " */
};
```

2.3 Relative operators

Are used for comparison of two values of identical type. The first value is compared to the second therefore logic value True(true) or False(lie) is formed. It is less - '<', aieuoa - '>', it is equal - '=', it is not equal - '<>', it is less than or equal - '<='; aieuoa eee ?aiii - '>='.

2.4 Instruction if-then

Probably, there is no trading expert who has no this instruction. Since the situation in the market all time varies all time is necessary that that with what that to compare or check. For this purpose this instruction also is used.

If(condition) then(action an event at the validity of a condition)
else(action an event at **lozhnosti** conditions)
else is a unessential part of the instruction.

Example:

```
If k> n then k=k+1; // 1e
If k> b then k=k+1 else k=k-1; // 2e
```

Notice in the second example after the first action(k=k+1) there is no semicolon, i.e. before else <> To put it is not necessary. If it is necessary to execute some actions it is possible to use a design **begin.. end;** or **{...};**

Example:

```
If k> b then {k=k+1; b=b-1;};
If k> b then {a=a+1; b=b-1;}
else {k=k-1; b=b+1;};
```

2.5 Variables of logic type

These variables can have only 2 values True(true) or False(lie). They are used as flags allowing something or forbidding. With variables of logic type logic operators work: **and**, **or**, **not**.

```
Var: k(True), n(false);  
{  
k = FreeMargin >= 1000;  
If not k then exit;  
};
```

There is a compulsory output from the expert if free **marzha** less or it is equal 1000.

We can write also **if k<> True** or **if k=False** and all this will have one sense. Instead of what after **if** to write a logic variable and to check her on equality true, it is possible to write simply a variable, and instead of check on equality False, before a variable the logic operator **not**, as in our case is put.

```
If k > 0 and b > 0 then exit;
```

The operator **and**(E) groups conditions, action after **then** will be executed only at the validity of all conditions.

```
If k > 0 or b > 0 then exit;
```

The operator **or**(or) chooses even one true condition. I.e. if any of two variables is more 0 that action will be executed.

The operator **not**(not), is applied to logic variables. For variables of numerical type the relative operator not equally is used **<>**.

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The original of clause - [FOREX MAGAZINE ? 2 from 09.02.2004](#)

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The Lesson # 3

Hello dear readers! Probably, two previous lessons were not so interesting since it was impossible to see results of the work personally. Believe, they were necessary for the further, high-grade work. In this lesson we shall learn to open positions and we shall disassemble syntax of the reference to a file of quotations.

3.1 Function **SetOrder**

With the help of function **SetOrder** it is possible to open positions on purchase and sale under the current price or to place the postponed warrants.

```
SetOrder(operation, lots, price, slippage, stoploss, takeprofit, color)
```

- **operation** - type of operation(op_buy, op_sell, op_buylimit, op_buystop, op_selllimit or op_sellstop);
- **lots** - quantity **lotov**;
- **price** - the price of the transaction or the postponed warrant;
- **slippage** - as much as possible allowable **proskalzyvanie**;
- **stoploss** - level Stop Loss of the warrant;
- **takeprofit** - level Take Profit of the warrant;
- **color** - color on the schedule.

3.1.1. **Operation(operations)**

Operation can divide 2 kinds, it is an input under the current price or installation of the postponed warrant.

For an input under the current price operation will look like: **op_buy** or **op_sell**:

- **Op_buy** - purchase of the contract under the current price, in **price** should be specified **ask**.
- **Op_sell** - sale of the contract under the current price, in **price** should be specified **bid**.

For exhibiting the postponed warrant operation will look like: **op_buylimit**, **op_buystop**, **op_selllimit** or **op_sellstop**.

If we want to expose the postponed warrant on **purchase** provided that the current price **below** the prices of execution of the warrant operation will look like **op_buystop**. I.e. we plan, that the price will go further in the same direction(on breakdown, upwards).

If we want to expose the postponed warrant on **sale** provided that the current price **below** the prices of execution of the warrant operation will look like **op_selllimit**. I.e. we plan, that the

price will be developed and there will be in an opposite direction(turn).

If we want to expose the postponed warrant on **purchase** provided that the current price **above** the prices of execution of the warrant operation will look like **op_buylimit**. I.e. we plan, that the price will be developed and there will be in an opposite direction(turn).

If we want to expose the postponed warrant on **sale** provided that the current price **above** the prices of execution of the warrant operation will look like **op_sellstop**. I.e. we plan, that the price will go further in the same direction(on breakdown, downwards).

3.1.2. Lots(*loty*)

For the instruction of quantity **lotov** in the warrant, you can write particularly number, for example, 1 or 2. I recommend to write reserved variable **Lots** since in **MT** you can directly put any quantity **lotov**, thus your expert becomes more flexible.

3.1.3. Price(*the price of execution of the warrant*)

For an input under the current price operations **op_buy** or **op_sell**, it is necessary to use the prices **ask** and **bid** accordingly. For an input the postponed warrants it is possible either to write the concrete price or to use expression of such kind: **** ask+30*point ****. What does it mean? It means current ask(for example, 1.2800) to add 30 items, i.e. the price of an input 1.2830. **Point** is the price of item on concrete currency pair, for EURUSD point=0.0001, for USDJPY point=0.01. The price of item will be defined itself, it **MT** will make for you. It is possible to write and so: **ask+0.0001** and it will be correct but what to connect such expert to USDJPY it it would be necessary to alter. For a writing of more flexible experts I recommend to use always the reserved variable **point**.

3.1.4. Slippage(*proskalzyvanie*)

If **proskalzyvanie** will make the big size, than specified operation of the warrant will be rejected. Most likely(if a condition of an input will not change) the expert will try to open repeatedly a position, and will open it only in the event that **proskalzyvanie** will make size less specified.

3.1.5. Stoploss(*stoploss*)

It is necessary to understand, that **stoploss** it is simple value of the price at which the position will be closed compulsorily. **T.e** in a field **stoploss**, it is possible to write the concrete price simply.

For the instruction **stoplossa** I recommend to leave a variable **stoploss**, and at creation of the expert(or in a cap of the expert) to expose the necessary size. Due to this your expert becomes more flexible and the size **stoplossa** can be changed directly in **MT**, in adjustments of the expert. Expression will look like: **** ask+stoploss*point ****. It is fair for constant **stoplossa**.

If you want to have dynamic(changing) **stoploss**, it can be considered in a variable. For example: "**sl=L[1]**"; it means that stoplos is equal to a floor price of the last bar. Below I shall tell about it more in detail.

3.1.6. Takeprofit(tejkprofit)

All that is told in item 3.1.5. completely as applied and for **tejkprofita**. To tell more nothing.

3.1.7. Color(Color)

In this field color in which the arrow in a window of quotations will be painted at opening a position is underlined. Also the arrow will appear opposite to the price on which there was an operation of the warrant. **MT** supports many colors, for example: gray, red, blue, etc.

3.1.8 Examples of use of function SetOrder

The warrant on purchase:

```
SetOrder(op_buy, lots, ask, 3,  
bid-stoploss*point, bid+takeprofit*point, green);
```

The warrant on sale:

```
SetOrder(op_sell, lots, bid, 3,  
ask+stoploss*point, ask-takeprofit*point, red);
```

Pay attention stops are considered from **bid** for the warrant on purchase and on **ask** for the warrant on sale. This fact takes place because, for execution really incorporated, for example 30 items of stop, it needs to be considered from the real price of closing of the warrant! But be not surprised, if will see in a tester, for example, closing of a position on **stoplosu**, not on 30oe items of the loss, and on 35, **spred** anybody in fact did not cancel.

The postponed warrants:

```
SetOrder(op_sellstop, 1, bid-50*point, 3, (bid-50*point) +StopLoss*Point, (bid-  
50*point)-TakeProfit*Point, blue);  
ho=h[1];  
SetOrder(op_buystop, lots, ho, 3, ho-StopLoss*Point, ho+TakeProfit*Point,  
blue);
```

3.2. The reference to a file to quotations

Files of quotations have the following names.

- **Close(C)** - the price of closing,
- **Open(O)** - the price of opening,
- **High(H)** - a ceiling price,
- **Low(L)** - a floor price,

- **Volume(V)** - volume.

3.2. The reference to a file to quotations

You can use these names or reduced, they in brackets. References to files of quotations it is carried out, as well as to usual elements of a file through square brackets. The index 0, is the current bar, 1 last, etc. I.e. **c[1]** - the price of closing of the last bar, **o[0]** - the price of opening of the current bar, **h[2]** - a ceiling price of a before last bar. Have in view of what addressing to the current bar(an index 0) it is possible to be confident an invariance only his prices of opening, nevertheless his other parameters(H, L, V, C) can change in due course. Names of files without indexes H, C, etc. the expert will understand as value on the current bar, i.e. with an index 0(H=H[0], C=C[0]), etc.

Now we shall create the first trading expert. We together on steps created the expert in the first lesson, and I think, you will not have problems. If suddenly will arise, glance there.

In adjustments of the expert it is exposed **stoploss** in 40 items, **tejkprofit** 100, quantity **lotov** 1. You can experiment then with other values. We test on I1, for example, on EURUSD.

```
/*[[
Name: = Expert2
Author: = Fxtest
Link: = forextimes.ru
Lots: = 1.00
Stop Loss: = 40
Take Profit: = 100
Trailing Stop: = 0
]]*/

// If 1 already there is that leave(it kol-in open positions)
if totaltrades=1 then exit;

if c[1]-h[2]> 10*point
then SetOrder(op_buy, lots, ask, 3, l[1]-stoploss*point,
bid+takeprofit*point, green);
if l[2]-c[1]> 10*point
then SetOrder(op_sell, lots, bid, 3, h[1] +stoploss*point, ask-
takeprofit*point, red);
```

I congratulate on the first trading expert. Except for **totaltrades** anything I shall not explain, **t.k** in a today's lesson there is all for understanding of algorithm, for fastening a material strongly recommend to understand. Also it will be useful, if you will try to alter it and will experiment with stops.

- **TotalTrades** - total of open positions and the postponed warrants in the trading terminal.

In the following lesson we shall disassemble cycles and we shall write more complex expert.

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The Lesson # 4

Hello, dear readers. Today we shall get acquainted to operators of cycles. Also we shall write the new expert.

4.1. The general *svedenja* about cycles

The cycle is an operator who repeats a fragment of the program the prisoner in a body of a cycle until will work a condition set by the user. Cycles are frequently used for work with files, in our case it is files from quotations or values of indicators.

$(c[0] + c[1] + c[2])/3$ is average arithmetic three prices, or simple sliding average with the period of averaging 3. But business is much more difficultly if it is necessary to take average arithmetic with the period 30, for this purpose it is much easier to use a design of a kind:

```
for i=0 to 30
{
sr=sr+c[i];
};
sr=sr/30;
```

Also cycles will allow you to choose the necessary element from the big data file. For example, frequently it is necessary to find maximal High or minimal Low, for some last bars, for exhibiting *stoplossa*.

Let's find minimal Low, for installation *stoplossa* for *longa*. Search we shall carry out from last 10 bars(generated).

```
MinL=L[1];
For i=1 to 10
{
if L[i] <minL then minL=L[i];
};
```

Let's find maximal High, for installation *stoplossa* for *shorta*.

```
MaxH=H[1];
For i=1 to 10
{
if H[i]> MaxH then MaxH=H[i];
};
```

Now while in details to disassemble the cycles available in MQLII.

4.2. Cycle For

Cycle For provides performance of the instructions made in a body of a cycle specified user, number of times.

```
for i = 1 to 10 begin
// a body of a cycle
end;
```

i - it is a variable which will increase for unit, on each iteration of a cycle. In our example initial value of a variable is equal 1, final 10, **to** the cycle of 10 times will execute a body of a cycle. Initial and final value can be anyone, but final should be more. If you want, that the cycle counted a variable in other party(aside reduction) instead of keyword **To** it is necessary to use **Downto**.

```
for i=10 downto 1 begin
// a body of a cycle
end;
```

This cycle also will be executed 10 times, only the variable will decrease from 10 up to 1.

4.3. Cycle While

This cycle, differs from **For** that the quantity of iterations is not known beforehand. The body of a cycle is carried out, while the condition of a cycle is satisfied.

```
while a > b
begin
// a body of a cycle
end;
```

a > b is a condition of a cycle.

4.4. Instruction Break

Instruction **Break** ahead of schedule interrupts performance of cycle **For** or **While**. It is actual if the cycle is used for search of any element, and it has been found. This instruction can be applied only in a body of a cycle. If some cycles are enclosed each other the nearest cycle(a cycle in which body the instruction is enclosed directly) interrupts.

```
for i=1 to 100
{
if l[i] > l[i+1] and l[i+1] < l[i+2]
then {Npips=i; break;};
}
```

This design searches in the last 102 bars for a fractal from 3 bars if it is found earlier, in variable **Npips** his number and a cycle is remembered is left. I do not explain, why in the last 102, instead of in 100 bars, I hope, that you will understand and will understand.

4.5. Instruction Continue

Instruction **Continue** ahead of schedule interrupts performance of the current iteration and begins performance of a cycle all over again. It is the instruction it is applied, for example, when already clearly, that at the given stage of the necessary element is not present and it is necessary to go further, not executing some instructions in a body of a cycle.

4.6. The expert

Today we shall write the expert for game on **razvorotnyh** candles "molot" and "hung up", in their strongest displays when the prices of opening and closing are equal(without a body). Algorithm not complex. If after the bull movement we have a candle with a long top shadow and short bottom we wait the following bear candle and on its closing we sell. If after the bear movement we have **svechku** with a long bottom shadow and short top we wait bull **svechki** and we buy. **Stoplossy** we place on long shadows plus, the specified quantity of items.

```
/*[[
    Name: = Expert3
    Author: = Fxtest.ru
    Link: = forextimes.ru
    Lots: = 1.00
    Stop Loss: = 20
    Take Profit: = 40
    Trailing Stop: = 0
]]*/

defines: tenmax1(10), tenmin1(5), telodo1(5);
var:tenmax(0), tenmin(0), telodo(0);

// We multiply all variables not the price of item
tenmax=tenmax1*point; // a long shadow
tenmin=tenmin1*point; // a short shadow
telodo=telodo1*point; // a body of a bar up to razvorotnoj candles
if TotalTrades=1 then exit; // we leave if there is an open position

if((o[4]-c[4])> telodo and(o[3]-c[3])> telodo)
or(o[3]-c[3])> 2*telodo
then
{
    // or one in 2 times is more than 2 average
    // a condition on purchase presence of a descending trend
    // from 2o not short svechej, or last long bear

    if o[2] =c[2] and(h[2]-o[2]) <tenmin
    and(o[2]-l[2])> tenmax and o[1]> c[1]
    then
    {
        SetOrder(op_buy, 1, ask, 3, l[2]-StopLoss*point,
            bid+takeprofit*point, green);
    };
};
```

At [the following lesson](#) we shall start to study the indicators which have been built - in in **MT**.

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The original of clause - [FOREX MAGAZINE ? 4 from 23.02.2004](#)

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The Lesson # 5

Hello dear readers!

Today we shall learn to write experts with use of the built - in indicators. In **MT** very many indicators of a classical technical expertise, so a field for actions rather big are realized. At the end of the lesson we shall write the expert.

5.1. Syntax of the indicator in general, a kind

```
iInd(period, mode, shift);
```

- **Ind** - the conditional name of the indicator;
- **Period** - the period of averaging;
- **Mode** - specifies what of values of the indicator more often is accepted(for indicators from two or more lines);
- **Shift** - the index specifies, what serial value of the indicator to take for calculation(0 these indicators current value, 1-last, 2-before last, etc. by analogy to indexes at quotations);

Before the name **of indicator Ind** there is a letter **i**, it is necessary for all indicators in **MT**.

5.2. Sliding average

Sliding average are the most widespread indicator. Therefore I would like to disassemble this indicator in more detail.

```
iMA(period, ma_method, shift)
```

- **period** - the period of averaging;
- **ma_method** - this parameter is underlined for a method of calculation of average, the parameter can accept the following values: **MODE_SMA**, **MODE_EMA**, **MODE_SMMA**, **MODE_LWMA**;
- **Shift** - the index specifies, what serial value of the indicator to take for calculation(0 these indicators current value, 1-last, 2-before last, etc. by analogy to indexes at quotations).

Examples:

- **iMA(21, MODE_SMA, 1)** - the last value sliding average of simple type with the period of averaging 21;

- **iMA(9, MODE_EMA, 0)** - the current value sliding average **eksponentsialnogo** type with the period of averaging 9.

By default indicators are under construction from the prices of closing, therefore values of indicators with an index 0, **t.e** the current values on a formed bar all time will vary together with the price.

5.3. Extended(expanded) indicators

As I already spoke, indicators are under construction from the prices of closing(close) more often. It not always satisfies to inquiries of users, therefore in arsenal **MT** is extended(expanded) indicators. By the current moment exists 7 extended indicators:

ADX extended:

```
iADXEx(period, applied_price, mode, shift)
```

CCI extended:

```
iCCIEx(period, applied_price, shift)
```

Bolinger bands extended:

```
iBandsEx(period, deviation, bands_shift, applied_price, mode, shift)
```

MACD extended:

```
iMACDEx(fast_ema_period,
slow_ema_period, signal_period, applied_price, mode, shift)
```

Moving average extended:

```
iMAEx(period, ma_method, ma_shift, applied_price, shift)
```

Momentum extended:

```
iMomEx(period, applied_price, shift)
```

RSI extended:

```
iRSIEx(period, period2, applied_price, mode, shift)
```

If you have noticed, any of the expanded indicators has a parameter **applied_price**. This parameter can accept 7 values: PRICE_CLOSE, PRICE_OPEN, PRICE_HIGH, PRICE_LOW, PRICE_MEDIAN, PRICE_TYPICAL and PRICE_WEIGHTED. I.e. the indicator can be under construction from the price of closing, the price of opening, a ceiling price, a floor price, PRICE_MEDIAN((high+low)/2), PRICE_TYPICAL((high+low+close)/3), PRICE_WEIGHTED((high+low+close+close)/4). All names of the expanded indicators come to an end letters **Ex**, and only it differ from names of the same standard indicators.

5.4. The expert

For fastening knowledge, we shall write the expert. It will use 2 indicators, sliding average with the big period and RSI. If RSI is higher than the top zone determined by us, it was developed downwards and average is directed downwards the expert will sell. If RSI below bottom zone, it was developed upwards and average is directed upwards it is bought. The output from a position is carried out on the exposed stops.

```
/*[[
Name: = Expert4
Author: = Fxtest.ru
Link: = forextimes.ru
Lots: = 1.00
Stop Loss: = 40
Take Profit: = 40
Trailing Stop: = 0
]]*/

defines: per(7), Upzone(70), Downzone(30), BigTrend(100);
// per - period RSI;
// Upzone, Downzone - overzony,
// BigTrend - the period of average showing a global trend

var: r1(0), r2(0), m1(0), m2(0);
// r1-last value RSI; r2-before last value RSI

r1=iRSI(per, 1);
r2=iRSI(per, 2);
m1=iMA(BigTrend, MODE_SMA, 1); // MA simple type(SMA)
m2=iMA(BigTrend, MODE_SMA, 2);

if TotalTrades <1 then
{
  // to play if open positions are not present
  if r2> r1 and r2> Upzone and m1 <m2
  then
  // if the extremum was formed and it is higher than the top zone,
  // and a global trend downwards, sell
  {
    SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
      ask-takeprofit*point, red);
    exit;
  };

  if r2 <r1 and r2 <Downzone and m1> m2
  then
  // if the extremum and it of below bottom zone,
  // and a global trend upwards was formed, buy
  {
    SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
      bid+takeprofit*point, green);
    exit;
  };
};
};
```

In [the following lesson](#) we shall learn to address to open to positions and compulsorily them to close, at operation of any condition.

Yours faithfully, Halhaljan Arthur.

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fxtest.ru

The original of clause - [FOREX MAGAZINE ? 5 from 01.03.2004](#)

◁ [[Section "Experts"](#)].. [[4 \[21\]](#)] ▷ {[6](#)} {[4](#)}

The Lesson # 6

Hello dear readers! Today we shall learn to supervise open positions. At the end of the lesson we shall write the expert. Serious difference of this expert from last will be that the output from a position will be carried out not only on stop to the warrant, but also on a condition of closing.

6.1. Quantity of open positions

For quantity of open positions variable **TotalTrades** answers. If you want to have always only one open position it is possible to use a design:

```
If TotalTrades=0 then
{
//..
};
```

Or

```
If TotalTrades=1 then exit;
```

6.2 Function OrderValue

Function **OrderValue** parameters of value of an open position.

Syntax:

```
OrderValue(position, mode)
```

- **Position** - a serial number of an open position;
- **Mode** - this parameter to accept set of values depending on that what parameter of an open position it can is necessary to receive.

Mode can have the following appearance:

- **VAL_CLOSEPRICE** - the current price of closing;
- **VAL_CLOSETIME** - *vremjazakrytija*;
- **VAL_COMMENT** - the comment;
- **VAL_LOTS** - quantity *lotov*;
- **VAL_OPENPRICE** - the price of opening of a position;
- **VAL_OPENTIME** - time of opening of a position;
- **VAL_PROFIT** - current *profit*;
- **VAL_STOPLOSS** - the price of operation *stoplossa*;
- **VAL_SWAP** - the current swap for carry of a position;
- **VAL_SYMBOL** - currency pair;

- **VAL_TAKEPROFIT** - the price of operation **tejkprofita**;
- **VAL_TICKET** - number of a position;
- **VAL_TYPE** - type of a position(buy, sell, etc.).

Having some open positions, or even one, for identification of parameters of an open position are convenient to use a cycle **for**.

```
for cnt=1 to TotalTrades
{
  // it is an open position? OP_BUY or OP_SELL
  if OrderValue(cnt, VAL_TYPE) <=OP_SELL and
    OrderValue(cnt, VAL_SYMBOL) =Symbol then // the tool coincides?
  {
    If OrderValue(cnt, VAL_TYPE) =OP_BUY then
    {
      // the long position actions
    }
  }
}
```

Is open

6.3. Function ModifyOrder

This function is necessary what to change established stop the warrant and **tejk profit**. For example, this function is used for **podzhatija stoplossa**(**trejling** stop).

Syntax:

```
ModifyOrder(order, price, stoploss, takeprofit, color)
```

- **Order** - on this parameter identification of the concrete warrant is carried out;
- **Stoploss** - new **stoploss**;
- **Takeprofit** - new **tejkprofit**;
- **Color** - color in which the badge on the schedule of the prices will be painted.

Example of change **stoplossa**:

```
If TrailingStop> 0 then // the user has exposed in adjustments trejling-stop
{
  // means we go it to check
  If(Bid-OrderValue(cnt, VAL_OPENPRICE))>(Point*TrailingStop) then
  {
    If OrderValue(cnt, VAL_STOPLOSS) <(Bid-Point*TrailingStop) then
    {
      ModifyOrder(OrderValue(cnt, VAL_TICKET), OrderValue(cnt,
        VAL_OPENPRICE),
        Bid-Point*TrailingStop, OrderValue(cnt, VAL_TAKEPROFIT), Red);
      Exit;
    }
  }
}
```

```
}
```

6.4 Function CloseOrder

With the help of this function closing an open position is carried out. More often it occurs at operation of the established condition. I.e. together with the operator **if-then**.

Syntax:

```
CloseOrder(order, lots, price, slippage, color);
```

- **Order** - on this parameter identification of the concrete warrant is carried out;
- **Lots** - quantity **lotov** at an open position;
- **Slippage** - **proskalzyvanie**;
- **Color** - color in which the badge on the schedule of the prices will be painted.

Example:

```
CloseOrder(OrderValue(cnt,  
VAL_TICKET), OrderValue(cnt, VAL_LOTS), Bid, 3, Violet);
```

6.5 Expert

For a basis we shall take the expert from [the last lesson](#), since his purpose - fastening of a material.

```
/*[[  
Name: = Expert6  
Author: = Fxtest.ru  
Link: = forextimes.ru  
Lots: = 1.00  
Stop Loss: = 80  
Take Profit: = 80  
Trailing Stop: = 0  
]]*/  
  
defines: per(7), Upzone(70), Downzone(30), BigTrend(100);  
// per - period RSI  
// Upzone, Downzone - overzony  
// BigTrend - the period of average, showing a global trend  
  
var: r1(0), r2(0), m1(0), m2(0), cnt(0);  
// r1 - last value RSI  
// r2 - before last value RSI  
r1=iRSI(per, 1);  
r2=iRSI(per, 2);  
m1=iMA(BigTrend, MODE_SMA, 1); // MA simple type(SMA)  
m2=iMA(BigTrend, MODE_SMA, 2);  
  
ifTotalTrades <1 then  
{
```


to write rather serious experts.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 6 from 08.03.2004](#)
◁ [\[Section "Experts"\]](#).. [\[5 \[21\]\]](#) ▷ {7} {5}

The Lesson # 7

Hello, dear readers! In this lesson we shall write the expert. Letters has come not so much, the most interesting the algorithm of trader Meraba from Kharkov was.

7.1. Algorithm

Essence of the expert in increase in the size **lot** after closing the unprofitable transaction. This method refers to **Martingel**. After reception of the loss the new position with the increased quantity **lotov** opens, and received profit should block the last losses. Our expert will be rather simple, but the method can be developed indefinitely. A signal to action(to the first purchase or sales at absence of an open position) will be a turn of indicator MACD(fast MACD). Purchase is carried out at opening of the following bar, at negative MACD, formed an extremum, sale, on the contrary, accordingly. The signal to the first transaction has been chosen casually, it is possible to use any another. Game is planned on **tajmfrejme** I15 and next. After reception of the loss(works **stoploss**), the new position in the same party if second time is received the loss opens, the position opens again in the same party, but last time. I.e. We have only 3 positions which can open in one party, it is made on a case of the big trend. If there will be a strong and long trend, we shall receive a heavy loss, but we shall not lose the deposit. The periods of averaging MACD, all 3 **stoplossa**, 3 **tejkprofita**, and 3 quantities **lotov** are adjusted. I was not engaged in adjustment of the expert, it is necessary to do it under the concrete tool and concrete **tajmfrejme**.

7.2. The expert

```
/*[[
Name: = Expert7
Author: = fxttest.ru
Link: = forextimes.ru
Lots: = 1.00
Stop Loss: = 0
Take Profit: = 0
Trailing Stop: = 0
]]*/

defines: MACDfast(12), MACDslow(26), MACDsignal(9), s11(30), s12(30),
defines: s13(30), tp1(20), tp2(20), tp3(20), lot1(1), lot2(2), lot3(7);

/*Iienaiea External variables, adjustment MACD, stops and quantity lotov */

var:macd1(0), macd2(0), macd3(0), b1(0), ss(0), sb(0), fb(0), fs(0);

/*
macd1-macd3-values fast MACD
b1-balance before opening the last position
ss-quantity of open positions on sale
sb-quantity of open positions on purchase
```

```

fb-signal MACD to the first purchase
fs-signal MACD to the first sale
*/

if FreeMargin <1000 then exit; // an output at shortage free marzhe

if TotalTrades=0 then
{ // at absence of open positions
  if balance> b1 then {fb=0; fs=0; ss=0; sb=0;
};

/* If the balance has increased after closing last transaction
to null all variables */

macd1=iMACD(MACDfast, MACDslow, MACDsignal, MODE_MAIN, 1);
/* calculation fast MACD*/
macd2=iMACD(MACDfast, MACDslow, MACDsignal, MODE_MAIN, 2);
macd3=iMACD(MACDfast, MACDslow, MACDsignal, MODE_MAIN, 3);

if macd1 <0 and macd2 <0 and macd3 <0 and macd1> macd2
and macd3> macd2 and sb=0 and ss=0
then fb=1;

if macd1> 0 and macd2> 0 and macd3> 0 and macd1 <macd2
and macd3 <macd2 and ss=0 and sb=0
then fs=1;

/*oneiaey Extrema */

if fb=1 and sb=0 then
{ /* if the signal to purchase was and it is first warrant that to buy
to cancel a signal to purchase to equate 1 to the counter of open
positions on purchase, the current balance */
  fb=0 is fixed; sb=1; b1=Balance;
  SetOrder(op_buy, lot1, ask, 3, bid-sl1*point, bid+tp1*point, green);
  exit;
};

if Balance <b1 and sb=1 then
{ /* if the balance has decreased and 1 position was open,
to equate 2 to the counter of open positions on purchase and to open
2? a position */
  sb=2; b1=Balance;
  SetOrder(op_buy, lot2, ask, 3, bid-sl2*point, bid+tp2*point, green);
  exit;
};

if balance <b1 and sb=2 then
{ /* if the balance has decreased and the position was open 2y,
to equate 0 to the counter of open positions on purchase and to open
3? a position. 0 it is equated, since it is last position in a series */
  fb=0; sb=0;
  SetOrder(op_buy, lot3, ask, 3, bid-sl3*point, bid+tp3*point, green);
  exit;
};

// Sales

```

```

if fs=1 and ss=0 then
{ /* if were a signal to sale and it is first warrant that to sell
to cancel a signal to sale and to equate 1 to the counter
of open positions on sale, the current balance */
fs=0 is fixed; ss=1; b1=Balance;
SetOrder(op_sell, lot1, bid, 3, ask+sl1*point, ask-tp1*point, red);
exit;
};

if Balance <b1 and ss=1 then
{ /* if the balance has decreased that to sell
to equate 2 to the counter of open positions on sale,
the current balance */
ss=2 is fixed; b1=Balance;
SetOrder(op_sell, lot2, bid, 3, ask+sl2*point, ask-tp2*point, red);
exit;
};

if balance <b1 and ss=2 then
{ /* if the balance has decreased that to sell in last ?ac*/
ss=0;
SetOrder(op_sell, lot3, bid, 3, ask+sl3*point, ask-tp3*point, red);
exit;
};
};

```

Whether this expert is necessary for you, to solve to you. For me such methods are extremely psychologically not comfortable. But on theme [Martingela](#) there was a plenty of conversations at forums, I am glad that we though have a little touched this theme. Probably, someone from readers will become interested in him and finally will be convinced of the opposite.

In [the following lesson](#) we shall start to write own indicators.

Yours faithfully, Halhaljan Arthur.
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The original of clause - [FOREX MAGAZINE ? 7 from 15.03.2004](#)

◁ [\[Section "Experts"\]](#).. [\[6 \[21\]](#) ▷ {8} {6}

The Lesson # 8

Hello, dear readers! Today we shall start to study to write own indicators.

8.1. The user indicators in the expert

Values of the user indicator for his use in the expert are transferred with the help of function **iCustom**. Instead of section **Defines** in experts there is section **Inputs**, she has the same sense. In section **Inputs** there are external variables, their values can be changed, not changing a code of the indicator. The indicator can consist their maximum of two, a minimum of one data file, the first is designated **MODE_FIRST**, the second - **MODE_SECOND**.

For example, section **Inputs** looks like:

```
Inputs: Nbars(500), period(21);
```

I.e. at us two external variables and the indicator, **naprmer**, looks like one line. The reference to indicators in the expert will look like:

```
iCustom("MyIndicator", 500,21, MODE_FIRST, 0);
```

Where:

- **iCustom** - function user indicators,
- **MyIndicator** - the name of the indicator, is written in double inverted commas,
- **500** - value of the first parameter,
- **21** - value of the second **paremetra**,
- **MODE_FIRST** - the data undertake their first file **indikтора**,
- **0** - last value of the indicator(on the current bar).

Expression **iCustom("MyIndicator", 500,21, MODE_FIRST, 0)** will be identical to this **iCustom("MyIndicator", MODE_FIRST, 0)** since parameters of variables are not obligatory but if other values of the indicator wanted to use, than are specified **poumolchaniju**, it would be necessary to register them necessarily.

8.2. Structure of the indicator

As it has been told above instead of section **defines**, in indicators there is section **Inputs**, the code of the indicator begins with it and. In general that, the very first goes "cap" of the indicator, but we shall consider her in the following item of the lesson.

```
Inputs: period(21), Bars(500); // external variables
Var: per(0), shift(0); // internal variables

// Further there is a code of the indicator
```

MetaEditor automatically creates a code of such kind:

```
SetLoopCount(0);
// loop from first bar to current bar(with shift=0)
For shift=Bars-1 Downto 0 Begin
    SetIndexValue(shift, 0);
End;
```

It means, that the indicator will be drawn from the beginning of history up to the end, it is possible to use such kind:

```
For shift=0 to Bars-1 Begin
    SetIndexValue(shift, 0);
End;
```

So the indicator will be drawn from the end of history, i.e. from the current bar and to come to an end the last. What method you choose to solve to you, but to cost to remember, that complex user indicators rather strongly brake work **MT** and consequently indicators do not appear on all history. In this case it is better to draw the indicator from last(current) bar. As you have already understood, filling of a file is carried out by a cycle, in this case cycle **For**.

Function **SetIndexValue(shift, 0)** fills in a file of the indicator for each bar. **Shift** is a cell of a file of the indicator(one cell is one bar), 0 is a value which it will be appropriated. Since files can be two, therefore for the second file function looks like:

```
SetIndexValue2(shift, 0).
```

The indicator which will form the channel between maximal and floor prices(H and L):

```
/*[[
Name: = H-L
Author: = fxttest.ru
Link: = forextimes.ru
Separate Window: = No
First Color: = Blue
First Draw Type: = Line
First Symbol: = 217
Use Second Data: = Yes
Second Color: = Red
Second Draw Type: = Line
Second Symbol: = 218
]]*/

Variable: shift(0);

For shift=0 to Bars-1 Begin
    SetIndexValue(shift, h[shift]);
    SetIndexValue2(shift, l[shift]);
End;
```

Frequently it happens it is necessary to use value of the indicator in the past. For this purpose function **GetIndexValue(shift)**, where **shift** - number of a cell of a file of the indicator is used. Function **GetIndexValue** accordingly can look like **GetIndexValue2**.

8.3. Parameters of display of the indicator

Parameters of the indicator for it **prorisovyvaniya** are in the top part of a code, "cap" of the indicator.

Separate Window: = No means, that the schedule of the indicator will be drawn in the same window, as the schedule of the prices. Thus, deduce a trend-watching indicators and indicators of value which not strongly differ from values of the prices. Otherwise **Separate Window: = Yes** then the indicator is deduced in a separate window, it is usual **ostilljatory**. In this case value of the indicator can strongly differ from values of the prices, i.e., for example, values are estimated in percentage.

Draw Type: = Line means, the indicator will be constructed as a line. Probably also construction of the histogram or a conclusion of a symbol. In case the indicator will look as a symbol, in a code of the indicator it is necessary to register a code of a symbol.

UseSecondData: = Yes means that the indicator will consist of two files, in our case of two lines.

First Color, First Draw Type and **First Symbol** concern to the first file of the indicator. **Second Color, Second Draw Type** and **Second Symbol** - **kovtoromu**.

Minimum Chart Limits, Maximum Chart Limits is minimal and maximal value of borders. These are unessential parameters which specify borders of the screen for display of the indicator. Are applied in case borders of display of the indicator are known beforehand.

In [the following lesson](#) we shall continue studying the user indicators on examples.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 8 from 22.03.2004](#)
◁ [Section "Experts".. [7 [21] ▷ {9} {7}

The Lesson # 9

Hello, dear readers! Today we shall write the expert and the user indicator. The expert will trade with use of the indicator.

9.1. Algorithm and a code of the indicator

The indicator uses two data files, it will consist of two lines. Both lines are sliding average. The first average is under construction from the ceiling prices, the second - from minimal. For this purpose we use the standard expanded indicator sliding average. It has such appearance:

```
iMAEx(period, ma_method, ma_shift, applied_price, shift)
```

In the indicator we have one external variable, she defines the period of average.

```
/*[[
Name: = urovni
Author: = forextimes
Link: = fxttest.ru
Separate Window: = No
First Color: = Blue
First Draw Type: = Line
First Symbol: = 217
Use Second Data: = Yes
Second Color: = Red
Second Draw Type: = Line
Second Symbol: = 218
]]*/

Inputs: per(21);
Variable: shift(0), HMa(0), lMa(0);
SetLoopCount(0);
// loop from first bar to current bar(with shift=0)
For shift=Bars-1 Downto 0 Begin
    HMa=iMAEx(per, MODE_EMA, 0, PRICE_HIGH, shift);
    lMa=iMAEx(per, MODE_EMA, 0, PRICE_LOW, shift);
    SetIndexValue(shift, HMa);
    SetIndexValue2(shift, lMa);
End;
```

Algorithm very simple, therefore I do not write the explanatory.

9.2. Algorithm and a code of the expert

The expert checks presence of a trend and traces position of the price concerning lines of the indicator. Presence of a trend is checked very primitively: last three values sliding by average, if each following more previous a trend bull, differently bear will be checked up. If at the bull trend the price less than bottom average the user indicator, is carried out purchase; if at the bear trend

the price more than the top line of the indicator is carried out sale.

The output is carried out both on stop to warrants, and on a condition. A condition of an output is achievement of an opposite line of the user indicator.

There are two external variables: **per** - defines the period of the indicator, **perMa** - defines the period of average, determining a direction of a trend.

There is a restriction on time for opening of a position. It is made that some positions on one bar did not open. The condition looks like:

```
if curtime-LastTradeTime <4*3600 then exit;
```

Figure before "*3600", this value **tajmfrema** in hours.

```
/*[[
Name: = expertUrovni
Author: = forextimes
Link: = fxtest.ru
Lots: =1.00
Stop Loss: = 30
Take Profit: = 50
Trailing Stop: = 0
]]*/

defines:per(5), perMa(21);
var:HMa0(0), LMa0(0), Ma1(0), Ma2(0), Ma3(0), cnt(0);
if curtime-LastTradeTime <4*3600 then exit;

/*
HMa0=iCustom("urovni", per, MODE_FIRST, 0);
LMa0=iCustom("urovni", per, MODE_SECOND, 0);
*/

HMa0=iMAEx(per, MODE_EMA, 0, PRICE_HIGH, 0);
LMa0=iMAEx(per, MODE_EMA, 0, PRICE_LOW, 0);

Ma1=iMAEx(perMa, MODE_EMA, 0, PRICE_close, 1);
Ma2=iMAEx(perMa, MODE_EMA, 0, PRICE_close, 2);
Ma3=iMAEx(perMa, MODE_EMA, 0, PRICE_close, 3);

if TotalTrades=0 then
{
  if Ma1-Ma2> 0 and Ma2-Ma3> 0 and ask <LMa0 then
  {
    SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
      bid+takeprofit*point, blue);
    exit;
  };

  if Ma3-Ma2> 0 and Ma2-Ma1> 0 and bid> HMa0 then
  {
    SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
      ask-takeprofit*point, red);
  };
};
```


The Lesson # 10

Hello, dear readers. Today we shall write the expert on algorithm which was sent by Sergey Matjuha. As we shall disassemble the questions sent in the letter. I think, they will be interesting to all.

10.1. Questions from the letter

The letter was sent by Sergey Matjuha and his friends Evgenie, Paul, Andrey and Dmitry from Moscow. I want to thank once again these people for interest to magazine and it is concrete to a heading.

Questions:

1. Within the framework of training a writing of experts, indicators and the experts working on the basis of indicators, whether it is possible to create such indicator which would show results of work of the expert.

For example, it would be possible to show directly in a window of the schedule of the prices lines(pieces of lines) from the moment of opening till the moment of closing of the warrant with mixture for example on size bid or ask, having painted them for presentation in different colors. It would be possible to add and pieces StopLoss-ia carrying to the concrete warrant(at once very well was it is seen drawn in StopLoss).

2. And in a separate window(not in a window of the schedule of the prices) it would be possible to show a condition of the account or percent of the profit, for example, with the help of histograms. Then it would be easily possible to define(at small scale **tajmfrejma**) in what periods of a trend the expert works most effectively.

Whether but I do not know probably it basically...

The answer:

Unfortunately, it to make it is impossible. The user indicators are under construction at once, i.e. all elements of a file of the indicator are determined. And the tester which has been built - in in **MT**, models passage of the price on the historical data for an estimation of potential of MTS. Therefore the indicator cannot be used as means of debugging though, certainly, it would be very convenient. It is necessary to be content curve profitableness. I hope, in new version MT the report on testing will increase, and new ways of debugging will be entered.

10.2. Algorithm of the expert

The algorithm of the expert also has been sent by Sergey Matjuhoj. Here it:

1. Each subsequent warrant has an opposite direction(if it was closed buy will open sell and on the contrary).
2. Warrants have no TakeProfit-ia.
3. Closing is carried out only with help StopLoss of warrants.
4. StopLoss should be necessarily "podzhimaemym"(trejling-stop).

Here are necessary, I think, only two variables: it is size StopLoss and a certain variable which would define a step through which it would be tightened StopLoss(I so I write about "certain" because to me and to my friends too working on FOREX, the example with TrailingStop and a principle of his action in [6 lesson](#) a little is not clear, and it can and does not approach for the given purposes). "

10.3. The expert

```

/*[[
Name: = expert10
Author: = forextimes
Link: = fxttest.ru
Lots: =1.00
StopLoss: = 20
TakeProfit: = 1000
TrailingStop: = 20
]]*/

var:cnt(0), f1(0), f(0);
if TotalTrades=0 then
{
  if f1=0 then
  {
    f1=1; f=2;
    SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
      bid+TakeProfit*point, blue);
    exit;
  };

  if f=1 then
  {
    f=2;
    SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
      bid+TakeProfit*point, blue);
    exit;
  };

  if f=2 then
  {
    f=1;
    SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
      ask-TakeProfit*point, red);
    exit;
  };
};

for cnt=1 to TotalTrades

```

```

begin
  /* it is a long position? */
  If Ord(cnt, VAL_TYPE) =OP_BUY then/* dlinnajapozitsija */
  {
    /* all over again we shall check up - whether is profit at this
    transaction more than a level trejling stop? We check Bid,
    as position BUY */

    If(Bid-Ord(cnt, VAL_OPENPRICE))>(TrailingStop*Point) then
    {
      /* yes, the position has profit more than value trejling stop
      (for example 30 items). Now it is necessary to check up, whether
      it is possible to put stop better than it was earlier? */
      If Ord(cnt, VAL_STOPLOSS) <(Bid-TrailingStop*Point) then
      {
        /* we change stoploss for level Bid-Trailing Stop */
        ModifyOrder(Ord(cnt, VAL_TICKET), Ord(cnt, VAL_OPENPRICE),
          Bid-TrailingStop*Point, Ord(cnt, VAL_TAKEPROFIT), Red);
        Exit;/* business have made - we leave. */
      }
    };
  };
  /* it is a short position? */
  If Ord(cnt, VAL_TYPE) = OP_SELL then
  {
    /* all over again we shall check up - whether is profit at this
    transaction more than a level trejling stop? We check Ask as position
    SELL */
    If(Ord(cnt, VAL_OPENPRICE)-Ask)>(TrailingStop*Point) then
    {
      /* yes, the position has profit more than value trejling
      stop(for example 30 items). Now it is necessary to check up,
      whether it is possible to put stop better than it was earlier? */
      If Ord(cnt, VAL_STOPLOSS)>(Ask+TrailingStop*Point) or
      Ord(cnt, VAL_STOPLOSS) =0 then
        /* an obligatory condition!!! */
      { /* menjaemstoplossnauroven Ask+Trailing Stop */
        ModifyOrder(Ord(cnt, VAL_TICKET), Ord(cnt, VAL_OPENPRICE),
          Ask+TrailingStop*Point, Ord(cnt, VAL_TAKEPROFIT), Red);
        Exit;
      }
    };
  };
};
end;
/* the end */

```

The first input is carried out by casual image. In our case it is purchase.

```

if f1=0 then
{
  f1=1; f=2;
  SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
    bid+TakeProfit*point, blue);
  exit;
};

```

The variable **f1** is a flag. Since she becomes equal 1, transition on the given condition does not occur any more, and casual purchase is carried out only 1 time. We should open each time an opposite position from last, therefore we have one more flag **f**. If **f=1**, the last position **long**, if **f=2**, blinkers.

Authors of the letter had problems with **trejling**-stop. Probably, in the last releases his algorithm me has been given not clearly. In the expert has been inserted algorithm of **trejling**-stop from the expert <TrailingStop> which is delivered together with **MT**. Comments to algorithm of **trejling**-stop have very much liked me. As soon as the profit on an open position became more sizes of **trejling**-stop, whether the expert checks it is possible to draw in **stoploss** if it is possible, **stoploss** is drawn in. The distance between the current price and **stoplossom** also is size **trejling** stop. **Podzhatie** occurs continuously, i.e. if the price will increase even 1 item on this item and it will be drawn in stoploss. Exposing value **stoplossa** right at the beginning(before the beginning of the test), this value **stoplossa** will be only up to the first **podzhatija**, then(after the first **podzhatija**) stoploss will be equal exposed **trejlingstopu**.

Since in algorithm was specified, that the output on **tejkprofitu** should not be, **tejkprofit** in adjustments is exposed 1000 items, i.e. obviously unattainable.

The expert under the first tests appeared unprofitable, but it can be possible to pick up working adjustments.

In [the following lesson](#) we shall write the new expert or the indicator.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 10 from 05.04.2004](#)

◁ [\[Section "Experts"\]](#).. [\[9 \[21\]](#) ▷

{[11](#)}

{[9](#)}

The Lesson # 11

Hello dear readers. All orthodox I congratulate on a holiday.

Today we shall write the expert, trade will be carried out only in a direction of a trend, signals will be reversive(i.e. the direction of opening of positions will constantly alternate), in the expert one will be used only sliding average.

11.1. Algorithm

To play a direction sliding average it is possible in several ways. In our expert we shall compare the last and before last value of average and if a difference more than the incorporated quantity of items, we shall close an old position and to open new.

As after closing one position, at once there is an opening opposite, in the expert is sustained [tajmaut DTS](#).

As this expert as against last can be connected to several tools and trade on them will simultaneously occur.

11.2. The expert

```
/*[[
  Name: = MA
  Author: = fxttest.ru
  Link: = forextimes.ru
  Lots: = 1.00
  Stop Loss: = 2000
  Take Profit: = 2000
  Trailing Stop: = 0
]]*/
defines: Npips(2), Per(21); // 2 external variables a Npips-difference
between values MA, Per-period MA
var: cnt(0), s(0), fb(0), fs(0), MA1(0), MA2(0);

if CurTime-LastTradeTime <10 then exit; // 10 naeoiaie oaeiaoo

// value MA it is written down in separate variables, for convenience(MA -
EMA, you can change type)
MA1=iMA(per, MODE_EMA, 1);
MA2=iMA(per, MODE_EMA, 2);

s=0; // the counter of open positions, in the beginning we it null each time

if fb=1 then
{
  fb=0;
  SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
    bid+takeprofit*point, green);
```

```

    exit;
};

// opening of opposite positions, under condition of equality(fb=1 or fs=1)
if fs=1 then
{
    fs=0;
    SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
        ask-takeprofit*point, red);
    exit;
};

for cnt=1 to TotalTrades
{
    if OrderValue(cnt, VAL_SYMBOL) =Symbol then s=s+1;
};

// for we count a cycle quantity of open positions on the current tool
if s<1 then
{
    // anee ioe?uouo iiceoeo iao oi...
    if MA1-MA2> Npips*point then
    {
        SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
            bid+takeprofit*point, green);
        exit;
    };

    if MA2-MA1> Npips*point then
    {
        SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
            ask-takeprofit*point, red);
        exit;
    };
    /* definition of an opportunity to open a position,
    notice in this block the expert will go only 1 times */
};

if s> 0 then
{
    // if there are open positions check on an opportunity of closing
    for cnt=1 to TotalTrades
    {
        if OrderValue(cnt, VAL_TYPE)<=OP_SELL and // buy eee sell
            OrderValue(cnt, VAL_SYMBOL)=Symbol then // eino?oiaio niaiaaaaoo
        {
            If OrderValue(cnt, VAL_TYPE)=OP_BUY then // anee buy...
            {
                if MA2-MA1> Npips*point then // a condition of closing
                {
                    CloseOrder(OrderValue(cnt, VAL_TICKET),
                        OrderValue(cnt, VAL_LOTS), Bid, 3, Violet); // close
                    fs=1; // a flag on opening of opposite position
                    Exit;
                };
            };
            If OrderValue(cnt, VAL_TYPE) =OP_SELL then // if sell

```

```

    {
      if MA1-MA2> Npips*point then // a condition of closing
      {
        CloseOrder(OrderValue(cnt, VAL_TICKET),
          OrderValue(cnt, VAL_LOTS), ask, 3, Violet); // close
        fb=1; // a flag on opening of opposite position
        Exit;
      };
    };
  };
};

```

In the expert stops of are exposed, unattainable that the position would be closed only on a condition. Certainly it not the working expert, but we have considered here some new approaches, methodically it will be very useful.

I yet have not solved, that will be in the following release, therefore write, show activity and, probably, your algorithm will be on pages of following number.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 11 from 12.04.2004](#)

◁ [[Section "Experts"](#)].. [[10](#) [[21](#)]] ▷ {[12](#)} {[10](#)}

The Lesson # 12

Hello dear readers! Today we shall write the elementary **probojnuju** system.

12.1. Algorithm

Probably, many of you know, that such **probojnye** systems. In the market there are moments when it is possible to assume with a high probability, that the price sharply will go upwards or downwards. For example, when **ranok pred** an output of serious news. All players wait and after an output open in the necessary party. But as the majority of readers of these lines is received with news with a delay, there is a sense to place the postponed warrants on **probitie** the current levels of consolidation.

The expert analyzes maximal and floor prices(shadows **svechej**) for the certain period(we can adjust the period) and the postponed warrants on both parties from the current price are exposed. It will be warrants of type And < op_sellstop >. For the greater efficiency we shall expose warrants only in a case if a difference between maximal and a floor price for the period no more than size stipulated by us,(this size defines width of the channel, news many wait, means, the channel is narrow).

We shall sum up algorithm. If is not present **otrytyh** positions and the exposed warrants. We find maximal and a floor price for the period, calculating a difference between them. If the difference is less than threshold which we have established we expose 2 warrants on breakdown. Warrants we expose with a small stock, for example, +5 items though, we shall make this size too adjusted since on different time frames the stock will be miscellaneous. After operation of one of the warrants, the second warrant leaves.

12.2. The expert

```
/*[[
Name: = Proboy
Author: = fxtest.ru
Link: = forextimes.ru
Lots: = 1.00
Stop Loss: = 20
Take Profit: = 40
Trailing Stop: = 0
]]*/

Defines: HL(85), N(9), Zapas(5);
/*
HL-a difference between the extreme prices,
N-the period, Zapas-a stock in exhibiting the postponed warrant */

var:s(0), b(0), ho(0), lo(0), i(0), fl(0);
```

```

/*
s-quantity postponed OP_sellSTOP
b-quantity postponed OP_BUYSTOP,
i-a variable of a cycle
ho-a move the price of the period,
lo-ieieiaeuuiuy the price of the period,
a fl-flag for exhibiting the second warrant */

/* 10 sek tajmaut while it has not passed the output from expert will be
carried out */
If((CurTime-LastTradeTime) <11) then Exit;

/* since simultaneously two warrants to put it is impossible, OP_sellSTOP it
is put after 10 sek, with the help of a flag */
if fl=1 then
{
    fl=0; // zeroing of a flag and exhibiting 2ai postponed
    SetOrder(OP_sellSTOP, lots, lo-Zapas*point, 3, lo+StopLoss*Point,
        lo-TakeProfit*Point, red);
};

b=0; // zeroing of variables for the account
s=0;
if TotalTrades=1 then exit; /* if 1 warrant that is open only, it is the
warrant in the market, we leave */

if totaltrades <> 0 then for i=1 to TotalTrades
    Begin
        If OrderValue(i, VAL_TYPE) =OP_BUYstop then
            b=b+1; // calculation of positions in a cycle
            if OrderValue(i, VAL_TYPE) =OP_SELLstop then s=s+1;
            if(s+b) =2 then exit; // if 2 postponed we leave
        end;

/* If 1 postponed has remained(it superfluous since one already became has
played, we delete it */
if TotalTrades<> 0 and(s+b) =1 then
{
    for i=1 to TotalTrades
        Begin
            If(OrderValue(i, VAL_TYPE) =OP_sellSTOP) or
                (OrderValue(i, VAL_TYPE) =OP_buySTOP) then
                DeleteOrder(OrderValue(i, VAL_TICKET), blue); // removal
        end;
    exit;
};

if TotalTrades=0 and(b+s) =0 then
    { // a presence minimal, a ceiling price
        ho=h[1];
        lo=l[1];
        for i=n DownTo 1
            Begin
                if h[i]> ho then ho=h[i];
                if l[i]

```

```
f1=1;
SetOrder(OP_BUYSTOP, lots, ho+Zapas*point, 3, ho-StopLoss*Point,
        ho+TakeProfit*Point, blue); // 1e from 2o
};
```

12.3. The conclusion

Since it is the most simple **probojnyj** algorithm, it, certainly, does not bring the worthy profit, but such systems exist in more complex variants. There is a sense to connect the expert only during the certain moments (before an output of news). It is possible to enter also additional conditions for length of shadows **svechej** inside the period or (e) to put restriction and on volume but since on **forekse** volume **tikovyj**, it will not give special improvements.

I would like to light the following release to your questions. I am confident, that during creation own experts at you they arise. Send all questions to me on a mail, I promise in the following release to answer all.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 12 from 19.04.2004](#)
◁ [[Section "Experts"](#)].. [[11](#)] [[21](#)] ▷ {[13](#)} {[11](#)}

The Lesson # 13

Hello dear readers. At many of you as I have understood from letters, creation of own experts is in full swing. It is natural, that there are questions as I and promised, this lesson will be devoted to answers to them.

13.1. The question-answer

"... During a writing of experts frequently there is a necessity to keep variables, by the current moment, in a separate file. In the description of language these moments are not so clearly described. The big request to tell about opportunities of preservation in more detail... "

Work with files is a theme of a separate lesson, about it we shall talk in the following of release. All the same I want what to tell on this question. Declaring variables in section var, we set their first value(value of variables at the very first start of the expert). After the expert is carried out, there is an output from the expert, but values of all variables is kept. On the following tic the expert is started again, but variables can already have other values, rather than in brackets after the name of a variable, in section var.

"... How it is possible to make the user indicator of 3 lines?... "

By the current moment in **MT** creation of indicators only with two data files, i.e. each separate indicator is possible, the maximum can consist of two lines. Actually this problems sharply is necessary in case the indicator from more than two lines should on one scale under the schedule of the prices. If the indicator should settle down in one window with the prices the most simple way is **razbitie** algorithm on some user indicators.

*"... Whether Is present in **MT** an opportunity to separate open positions hands from positions open by the expert, on one tool... "*

There is no specially such opportunity in **MT** is not stipulated. It is possible to distinguish positions, for example, on the size of a position(quantity **lotov**) or in the steps. On **trelingu** transactions to identify will fail. If roots of a question in an opportunity to test some experts on one account for this purpose the most convenient and simple decision is opening several demos of accounts and start simultaneously several **MT**.

*"... 1. An opportunity of the expert "**monitorit**" the market, i.e. serial check on opening under the set list of trading tools.(**Napr**: EUR/USDM30, EUR/USDH1, USD/CHFM30, GBP/USDH1). If the condition of opening is carried out to open a position and to work further only with it. After closing a position again to proceed to "monitoring".*

*2. The same, as in item 1, only after opening a position on **odomu** from tools and works on it to*

*continue "monitoring", and at performance of a condition on opening on other tool, to open a position and to continue **paralelno** to process 2 positions... "*

For monitoring, to each tool it is necessary **perekrepljat** the expert. In each of them it is possible to register a condition in the beginning of a code.

```
If TotalTrades> 0 then exit;
```

Sense in that if on any pair the position will be open, more no expert can enter the market. To cost to remember, that for the expert, for example, EUR/USDM30 and EUR/USDH1 it is one symbol, but different schedules, with all following.

*"... At me a question. I can not enter on key F4 in the editor in **MT** to write the expert. I **skachival MT** from the Internet. If it is possible explain.. "*

This problem at me was earlier, now something is not present, it is bug **MT**. **Perezagruzka** machines perfectly helps.

"... Why it is not visible external variables in the indicator, like I have correctly written all... "

Do not forget, that in experts section of external variables it defines, and in the user indicators it inputs and to confuse them it is not necessary.

"... Why the expert does not open a position if the condition has come?... "

In function SetOrder in the fourth parameter is as much as possible allowable **proskalzavanie** at opening the transaction, probably at you it very much is not great, and the market at the moment of the test was fast.

"... How to be if I want to attach to one tool some experts?... "

It is possible to open some schedules with one tool and to each schedule to attach some different experts.

*"... Why **MT** with the user indicator of own manufacturing very strongly brakes?... "*

MT has such problem, for its decision the indicator should be traced not for all history of quotations and, for example, for the last 500 bars. The quantity of bars for a portrayal of the indicator can be made in an adjusted variable.

I think, the following release will be practical, necessarily write, if you have questions or offers.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 14 from 26.04.2004](#)

◁ [[Section "Experts"](#)]. [[12](#) [[21](#) ▷ {[14](#)} {[12](#)}

The Lesson # 14

Hello dear readers. Today we shall check up effectiveness of one of many classical systems of trade. Those who read classical books on THAT, I think, know such rule. In a trend it is necessary to trade on a direction **trendovyh** indicators(for example, sliding average), and in **flete** about the help **ostsilljatorov**.

14.1 Algorithm

Actually only definition of a trend already more than a serious question. A trend we shall define about the help of indicator ADX, I think, you will not be against, since it **trendsledjashchy** the indicator. If ADX grows, and became the biggest for the last N values the position will open in a direction sliding average. If the trend is not present, i.e. ADX we has low values we look at value **ostsilljatora**. If ostsilljator in an extreme zone we open a corresponding position(on **otskok** from a zone). In quality **ostsilljatora** we shall use indicator Stochastic, then it it will be possible to replace or add one more.

Closing a position will be carried out both on stop to warrants, and on a condition. A condition it, disappearance of a trend, for positions open in a trend and achievement of opposite extreme zone Stochastic, for positions open in **flete**.

In external variables we shall lay out periods ADX, Stochastic and average; zones Stochastic for opening a position.

14.2 Expert

```
/*[[
    Name: = Trend-flet
    Link: = fxtest.ru
    Lots: = 1.00
    Stop Loss: = 0
    Take Profit: = 0
    Trailing Stop: = 0
]]*/

defines: PerMA(21), PerADX(14), StochK(5), StochD(3), Stochslow(3),
UpZone(75), DownZone(25), WindowADX(35), ADXmax(20), ADXmin(15), MApips(4);
var: Stoch1(0), Stoch2(0), ADX1(0), ADX2(0), Ma1(0), Ma3(0), cnt(0), f(0),
tr(0);
```

```

/*
PerMA-period MA
PerADX-period ADX
StochK, StochD, Stochslow-the periods stohastika
UpZone(75), DownZone stohastika WindowADX(35) window of comparison ADX
ADXmax-value ADX from which is considered(25) extreme zones,
that it is trend
ADXmin-value ADX from which it is considered that it flet
MApips-inclination MA
*/

if curtime-LastTradeTime<5*3600 then exit; // ia?aie?aiea ii a?aiaie
Ma1=ima(PerMa,mode_sma,1); //IA
Ma3=ima(PerMa,mode_sma,3);

Stoch1=iSTO(StochK, StochD, Stochslow, MODE_SMA, MODE_MAIN, 1); // Stohastik
Stoch2=iSTO(StochK, StochD, Stochslow, MODE_SMA, MODE_MAIN, 2);

ADX1=iADX(PerADX, MODE_MAIN, 1); // ADX
ADX2=iADX(PerADX, MODE_MAIN, 2);

if TotalTrades=0 then tr=0;
/* tr defines a trend if she is equal 1 that the transaction it is open as
trendovaja 2 fletovaja, the 0-transaction is not present */

if TotalTrades<1 then
{
  f=0; //oeaa ADX

  for cnt=1 to WindowADX {if ADX1

    if f=0 and ADX1> ADXmax then
    { // if ADX it is more
      if ma1-ma3> MApips*point then
      { tr=1;
        SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
          bid+takeprofit*point, green);
        exit;
      };
      if ma1-ma3<-MApips*point then
      { tr=1;
        SetOrder(op_sell,lots,bid,3,ask+stoploss*point,
          ask-takeprofit*point,red);
        exit;
      };
      // o?aiaiaua naaeae
    };

    if ADX1

    if Stoch1
      Stoch2 then
    { tr=2;
      SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
        bid+takeprofit*point, green);
      exit;
    };
  };
}

```

```

};

if Stoch1> UpZone and Stoch1> Stoch2 then
{ tr=2;
  SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
    ask-takeprofit*point, red);
  exit;
};

// fletovye transactions
};

if TotalTrades> 0 then
{
  for cnt=1 to TotalTrades
  {
    if OrderValue(cnt, VAL_TYPE)<=OP_SELL and
      OrderValue(cnt,VAL_SYMBOL)=Symbol then
    {
      If OrderValue(cnt,VAL_TYPE)=OP_BUY then
      {
        if(adx1 UpZone) then
        {
          /* conditions on closing trendovoj and fletovoj longovoj
            transactions */
          CloseOrder(OrderValue(cnt, VAL_TICKET),
            OrderValue(cnt, VAL_LOTS), Bid, 3, Violet);
          Exit;
        };
      };
      If OrderValue(cnt, VAL_TYPE) =OP_SELL then
      { if(adx1

```

14.3 Conclusion

Probably, many will tell, that the algorithm is not so universal also that it is unequivocally unprofitable, but this expert and does not apply for a role of the working expert. From the methodical party, the expert not such and idle time and I am confident, that the readers wishing in perfection to study language, something is necessary in it is underlined.

As I shall usually wait for your letters if questions will be much or will be especially interesting, I shall answer them in the following release.

Yours faithfully, Halhaljan Arthur.

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The original of clause - [FOREX MAGAZINE ? 15 from 03.05.2004](#)
 ◁ [\[Section "Experts"\]](#).. [\[13 \[21\]](#) ▷ [{15}](#) [{13}](#)

The Lesson # 15

Hello dear readers. I have received some algorithms of experts, in the following releases I shall necessarily realize some of them. In the same release, I would like to talk about parts of an initial code which are identical in any experts. Someone will tell, that each expert is individual, someone, that in all is a lot of general, but is exact, that some moments absolutely identical. It is check free **marzhi**, restriction of trade of the expert on time(trading sessions or restriction on days of week), **trejlingstop**, etc. About these fragments of a code of experts also there will be a speech.

15.1 Restriction **DTS**

For work of experts at **DTS** restrictions 2, this restriction not on experts particularly, and in general for work through **DTS** is more exact.

1. Restriction on free **marzhu**: **If FreeMargin<1000 then Exit;**
2. 10 second **tajmaut**, after opening a position: **If((CurTime-LastTradeTime)<10**

15.2 Possible checks

In the beginning of the expert it is possible to do check on

1. Correct exhibiting stops **If StopLoss<10*point or StopLoss> 100*point then exit;**
2. Check of quantity of bars of history(for the test for histories) **If Bars<200 then Exit;**
3. For game by one position it is possible to use a design of a kind **If TotalTrades<1 then { Or If TotalTrades=1 then exit;**
4. For start **trejlinga** **If TrailingStop> 0 then {**

15.3 Checks and restrictions on time

Sometimes there is a need to test the expert on any certain interval of history, conditions can look as follows:

If Year <> 2003 Then Exit; With the help of this restriction, testing of the expert will take place only for 2003

If Year> = 2004 And Month> 2 Then Exit; Testing of the expert before the certain date, in this case up to the end of February, 2004.

Conditions on checks of time inside day.

If Hour < 10 Or Hour > 19 Then Exit; Trade will be made in an interval with 10 up to 19 on time **MT**.

If Minute = 10 Then {Action will occur 10 minutes of each hour on time **MT**.

If Seconds = 10 Then {the Same, for seconds.

As in **MT** it is possible to do checks on time for the period of day, for this purpose there is a function **Day of week**. She can accept values from 1 up to 7, according to days of week, only numbering begins with revival. I.e. 1-Sunday, 2-Monday, etc.

If DayOfWeek = 3 Then Exit; the Expert will not work on Tuesdays.

15.4 Trejlingstopy

Certainly there is no sense to write new **trejlingstop** for each expert, it can be inserted into a code of the expert at desire.

```
If TrailingStop> 0 then
{
  for cnt=1 to TotalTrades
  begin
    /* if it is a long position? */
    If Ord(cnt, VAL_TYPE) =OP_BUY then/* the long position */
    {
      whether/* is profit at this transaction more than
      a level trejling stop? */
      If (Bid-Ord(cnt, VAL_OPENPRICE))>(TrailingStop*Point) then
      {
        /* the position has profit more than value trejling stop
        then is checked, whether it is possible to draw in stop? */
        If Ord(cnt, VAL_STOPLOSS)<(Bid-TrailingStop*Point) then
        {
          /* iia?eiaai noiieinn ai Bid-Trailing Stop */
          ModifyOrder(Ord(cnt, VAL_TICKET), Ord(cnt, VAL_OPENPRICE),
            Bid-TrailingStop*Point, Ord(cnt, VAL_TAKEPROFIT), Red);
          Exit;
        };
      };
    };
  };
  /* yoi ei?ioeay iiceoey? */
  If Ord(cnt, VAL_TYPE)=OP_SELL then
  {
    /* anou ee i?ioeo o yoie naaeae aieuo? ai
    o?iaaiu o?aeaeia noiia? */
    If (Ord(cnt, VAL_OPENPRICE)-Ask)>(TrailingStop*Point) then
    {
      /* the position has profit more than value trejling stop
      then is checked, whether it is possible to draw in stop? */
      If Ord(cnt, VAL_STOPLOSS)>(Ask+TrailingStop*Point) or
      Ord(cnt, VAL_STOPLOSS) =0 then
```

```

        {
            /* we draw in noieinn*/
            ModifyOrder(Ord(cnt, VAL_TICKET), Ord(cnt, VAL_OPENPRICE),
                Ask+TrailingStop*Point, Ord(cnt, VAL_TAKEPROFIT), Red);
            Exit;
        };
    };
};
end;
};

```

I am confident, that due to it not to complex preparations, process of a writing of experts only to improve and to become simpler a little.

In the following release we shall write the expert or the indicator which algorithm will seem to me more interesting.

Yours faithfully, Halhaljan Arthur.

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fxtest.ru

The original of clause - [FOREX MAGAZINE ? 16 from 10.05.2004](#)
 ◁ [[Section "Experts"](#)].. [[14](#) [[21](#)]] ▷ {[16](#)} {[14](#)}

The Lesson # 16

Hello dear readers. Today we shall write, the expert on algorithm which has sent me Aleksei Prokofew. Here citations from his letters.

*"... The Best tool for trade on currency pair EUR/USD within day - trading system Oscillator + CCI. Positions in this system open at crossing **ostsilljatorom** a zero line (for 4-hour and hour schedules). As a signal on closing of a position return crossing **ostsilljatorom** marks 100 (long positions) or marks-100 (short positions) serves.*

This expert on pages of magazine would like to see in consideration... "

I have asked, about what **ostsilljatore** there is a speech.

The answer to a question.

"... RSI, at crossing an average line - opening. Closing accordingly values 70 and 30... "

Well, we shall try all this to formalize.

16.1 Algorithm

I think, it is meaningful to write some experts.

The first expert will work only on CCI.

The input in **long** will carry out after crossing a zero line from below upwards. An output on crossing from top to down values 100.

The input in blinkers will be carried out after crossing a zero line from top to down. An output to crossing from below upwards values -100.

All crossings it is taken into account on the last bar, we enter on opening a new bar.

In the second expert we shall add RSI. I think to open and close positions on crossing RSI 70 and 30 special senses was not present, and from the letter is not clear as to coordinate two indicators. Therefore I suggest RSI to make the filter and to allow to enter into the market from signals CCI at Values RSI. I.e. at an input in **long** RSI should be at least less than 50, at an input in blinkers at least it is more 50. Limits of "correct" values we shall lay out in external variables.

16.2 Expert

```
/* [[  
Name: = CCI  
Author: = forextimes.ru  
Link: = www.fxtest.ru
```

```

Lots: = 1.00
Stop Loss: = 100
Take Profit: = 200
Trailing Stop: = 0
]]*/
Defines: per(14);
var: cnt(0), ccil(0), cci2(0);

if CurTime-LastTradeTime <8*3600 then exit; // restriction
// on quantity frequency of opening of transactions(for I4 2 bars)

ccil=icci(per, 1); // value cci
cci2=icci(per, 2);

if TotalTrades=0 then
{
  If FreeMargin <1000 then Exit;

  if cci2 <0 and ccil > 0 and ccil <100 then
  {
    SetOrder(op_buy, lots, ask, 3, bid-stoploss*point,
      bid+takeprofit*point, blue);
    exit;
  };

  if cci2 > 0 and ccil <0 and ccil >-100 then
  {
    SetOrder(op_sell, lots, bid, 3, ask+stoploss*point,
      ask-takeprofit*point, red);
    exit;
  };
};

/* Conditions on an input, are entered additional conditions ccil <100,
ccil >-100, that the condition on opening would not coincide with a condition
of closing */

if TotalTrades > 0 then
( // open positions are not present
  for cnt=1 to TotalTrades
  {
    if OrderValue(cnt, VAL_TYPE) <=OP_SELL and
      OrderValue(cnt, VAL_SYMBOL) =Symbol then
    {
      If OrderValue(cnt, VAL_TYPE) =OP_BUY then // is open long
      {
        // if cci2 > 100 and ccil <100 then
        if cci2 > 100 and cci2 > ccil then // a condition on closing
        {
          CloseOrder(OrderValue(cnt, VAL_TICKET),
            OrderValue(cnt, VAL_LOTS), Bid, 3, Violet);
          Exit;
        };
      };
      If OrderValue(cnt, VAL_TYPE) =OP_SELL then // it is open blinkers
      { // if cci2 <-100 and ccil >-100 then if cci2 <-100 and cci2 <ccil
then // a condition on closing

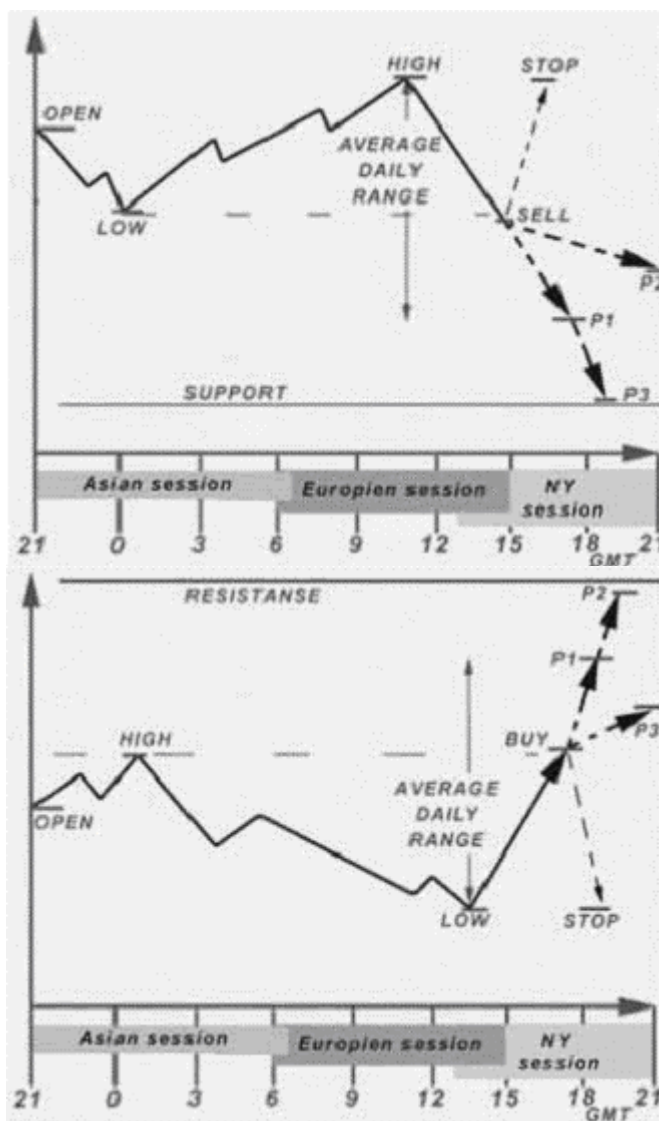
```

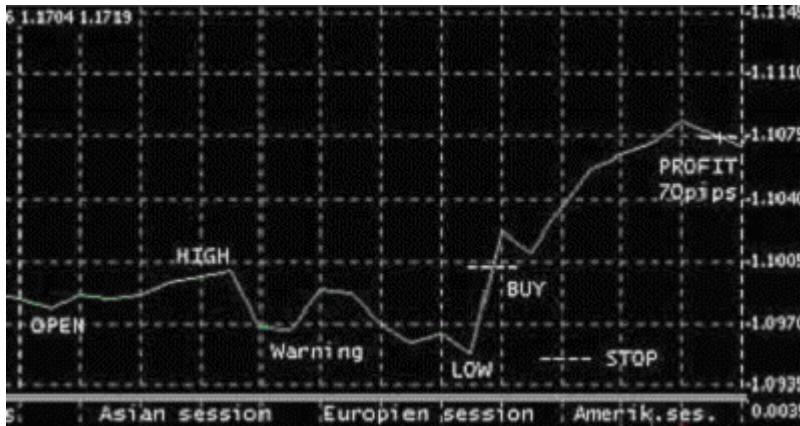

The Lesson # 17

Good afternoon dear readers! Today we shall write rather interesting expert. His algorithm is based on time, is more exact at trading sessions.

17.1 Algorithm

Not presented reader has sent me the following figures, and has asked on them, on the discretion to write the expert.





Well we shall try all this to describe words.

Conditions on an input in long. The price of opening of day is lower than a ceiling price for the period, the ceiling price is reached for the Asian session. The floor price for the period is achieved for the European session, and she is lower than the price of opening. The input is carried out in the beginning of the American session on breakdown of as much as possible achieved price. Stoploss-a floor price of day.

Condition on an input in blinkers. The price of opening of day is higher than a floor price for the period, achieved for the Asian session. The ceiling price for the period is achieved for the European session, and she is higher than the price of opening. The input is carried out in the beginning of the American session on breakdown of minimally achieved price. **Stoploss** - a ceiling price of day.

Time of an input in hours on time **MT**, it is accessible to regulation (in an external variable).

Since the specific goal at us is not present, for the purpose we shall receive banal **trejlingstopom**. Since we shall simply draw in **stoploss** under already achieved **profit**.

Here such elementary algorithm has turned out. It can be complicated strongly, but I did not put this purpose since whom it will interest those, will have such opportunity.

17.2 Expert

```

/*[[
Name: = Sessiy
Author: = forextimes.ru
Link: = www. Fxtest.ru
Lots: = 1.00
Stop Loss: = 0
Take Profit: = 1000
Trailing Stop: = 30
]]*/

```

```

Define: USAhour(13); // time for which we accept the beginning of the
American session,
// t.e we start to trade
var:cnt(0), i(0), MaxH(0), MinL(0), op(0), MaxHi(0), MinLi(0);

if hour=USAhour and TotalTrades=0 then
{ /* if time of the American session has come
and open positions are not present but is begun: */
op=o[USAhour]; /* so we determine the price of opening of day,
t.e the price of opening in 0 on GMT */
MaxH=h[1]; /* it is primary for a ceiling price of day we accept a ceiling
price last bar */
MinL=l[1]; /* it is primary for a floor price of day we accept a floor
price the last bar */

for i=USAhour DownTo 1
{ // in a cycle we prospect real minimal and ceiling prices of the period

if h[i]> MaxH then
{ MaxH=h[i]; MaxHi=i;
}; /* in variable MaxH we put a ceiling price, in MaxHi its index

if l[i] <MinL then
{ MinL=l[i]; MinLi=i;
}; /* in variable MinL we put a floor price, in MinLi its index */

if op> MinL and
MinLi <(USAhour-1) and
MinLi>(USAhour-6) and
hour <19 and
bid <MinL then
{ SetOrder(op_sell, lots, bid, 3, MaxH+5*point,
ask-takeprofit*point, red);
exit;
};

if op <MaxH and
MaxH <(USAhour-1) and
MaxHi>(USAhour-6) and
hour <19 and
ask> MaxH then
{ SetOrder(op_buy, lots, ask, 3, MinL, bid+takeprofit*point, blue);
exit;
};

/* We make check of conditions on an input above, we spoke about
conditions above More in detail */
};

for cnt=1 to TotalTrades
begin
/* it is a long position? */
If Ord(cnt, VAL_TYPE) =OP_BUY then/* the long position */
{

```

```

/* whether is profit at this transaction more than a level trejling
stop? We check Bid as position BUY */
If(Bid-Ord(cnt, VAL_OPENPRICE))>(TrailingStop*Point) then
{
  /* iiceoey has profit more than value trejling stop, whether it
  is possible to put stop better than it was earlier? */
  If Ord(cnt, VAL_STOPLOSS) <(Bid-TrailingStop*Point) then
  {
    /* we change stoploss for level Bid-Trailing Stop */
    ModifyOrder(Ord(cnt, VAL_TICKET), Ord(cnt, VAL_OPENPRICE),
      Bid-TrailingStop*Point, Ord(cnt, VAL_TAKEPROFIT), Red);
    Exit;
  };
};
};/* it is a short position? */
If Ord(cnt, VAL_TYPE) =OP_SELL then
{ whether/* is profit at this transaction more than a level
trejling stop? We check Ask as position SELL */
If(Ord(cnt, VAL_OPENPRICE)-Ask)>(TrailingStop*Point) then
{ /* the position has profit more than value trejling stop,
whether it is possible to put stop better than it was
earlier? */
  If Ord(cnt, VAL_STOPLOSS)>(Ask+TrailingStop*Point) or
  Ord(cnt, VAL_STOPLOSS) =0 then
  { /* we change stoploss for level Ask+Trailing Stop */
  ModifyOrder(Ord(cnt, VAL_TICKET), Ord(cnt, VAL_OPENPRICE),
    Ask+TrailingStop*Point, Ord(cnt, VAL_TAKEPROFIT), Red);
  Exit;
  };
};
};
};
end;

```

17.3 Conclusion

At testing for histories the picture turns out rather quite good. But is a little but. First, 40 transactions for 1 year and 3 months, certainly are not enough as any we did not apply filters. Second, for these year and 3 months of history we have a strong ascending trend, therefore it is more expedient to take into account only short positions.

Yours faithfully, Halhaljan Arthur.
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fxtest.ru

The original of clause - [FOREX MAGAZINE ? 18 from 24.05.2004](#)
 ◀ [[Section "Experts"](#)].. [[16](#) [[21](#)]] ▶
 {[18](#)}
 {[16](#)}

The Lesson # 18

Good afternoon dear readers! Today we shall write very simple expert. But with this idea to me some clients addressed already. The question is an inclination sliding average in a trend.

18.1 Algorithm

General idea such. Sliding average with the big period (>50;). We take value on the last bar, this value it is counted current. And value some bars back, for example 5. For example, at us an ascending trend, and we MA(70) is inclined upwards. Means we have, MA -a hypotenuse, some bars back (5) horizontal cathetus, and a difference between last value MA and value MA of 5 bars back vertical cathetus, the formed rectangular triangle. And on idea the inclination can be named a corner between MA(hypotenuse) and a horizontal cathetus. But we at once have a little but.

First, units of measurements of a vertical cathetus - items, and horizontal bars.

Second, though MA at us and the big period, nevertheless, not the straight line, therefore a corner between a curve and a straight line(a horizontal cathetus) to take it not absolutely correctly.

Well and thirdly, it is enough to change scale of schedules as the corner of an inclination will visually change.

Proceeding from all is higher listed, I have decided to leave corners in degrees, for definition of size of inclination MA.

In the best and more simple way of definition of inclination MA I have decided to choose definition of size vertical a cathetus in items. I.e. we, for example, always take a difference between last value MA and value 4 bars back, and we receive a certain size, the more this size, the is more inclination.

Whether as an additional signal to an input we shall be will define there is a current price above MA, for *longa* and is lower for *shorta*.

So final algorithm.

The input in *long* is carried out, if the difference between value MA on the last bar and back more the than specified size and the price of closing of the last bar is more than 4 bars MA on the last bar on 10 items or more.

Input in blinkers, on the contrary, accordingly.

The conditional output is carried out on return crossing **MA** by the price. I.e. the condition for closing **longa** is excess value **MA** above the price of closing.

In external variables we shall put the period of average and size in items determining a trend.

18.2 Expert

```
/*[[
  Name: = NaklonMa
  Author: = forextimes
  Link: = fxttest.ru
  Lots: = 1.00
  Stop Loss: = 50
  Take Profit: = 1000
  Trailing Stop: = 100
]]*/
defines: tr(10), per(70);
var: cnt(0), k(0);

k=0; // obnudenie a flag determining a trend

if iMA(per, MODE_SMA, 1)-iMA(per, MODE_SMA, 4)> tr*point then {k=1;};
/* a condition on vozhodjashchy a trend */

if iMA(per, MODE_SMA, 1)-iMA(per, MODE_SMA, 4) <-tr*point then {k =-1;};
/* a condition on nizhodjashchy a trend */

if TotalTrades=0 then
{ // if otkryh positions are not present...

  if k=1 and c[1]-iMA(per, MODE_SMA, 1)> 10*point then
  { Setorder(op_buy, lots, ask, 3, bid-StopLoss*point,
    bid+TakeProfit*point, blue);
    exit;
  };
  if k =-1 and iMA(per, MODE_SMA, 1)-c[1]> 10*point then
  { Setorder(op_sell, lots, bid, 3, ask+StopLoss*point,
    ask-TakeProfit*point, red);
    exit;
  }; // check on an additional condition and arrangement of warrants
};
if TotalTrades> 0 then
// we go to check on a condition of closing if there are open positions
{
  for cnt=1 to TotalTrades
  {
    if OrderValue(cnt, VAL_TYPE) <=OP_SELL and
    OrderValue(cnt, VAL_SYMBOL) =Symbol then
    {
      If OrderValue(cnt, VAL_TYPE) =OP_BUY then
      { if c[1] <iMA(per, MODE_SMA, 1) then
        // a condition of an output from longa
        { CloseOrder(OrderValue(cnt, VAL_TICKET),
          OrderValue (cnt, VAL_LOTS), Bid, 3, Violet);
```


The Lesson # 19

Hello dear readers! Any more one reader asked me to copy with **Omegi** or Metadrain **AMA** (adaptive sliding average) **Kaufmana**. In today's release we shall write it the indicator.

19.1 Algorithm

The detailed description of the indicator and algorithm of his work is stated to Konstantin Kopyrkinym, in clause "Dynamic sliding average. ?anou2", magazine "Modern trading". Clause in format PDF(475 kB), can **skachat** to the address <http://fxtest.ru/AMA.zip>

AMA Kaufmana it **eksponentsialno** smoothed sliding average, only the factor of averaging at it not constant, and varies depending on a situation in the market. At **flete** the factor of averaging increases, that **AMA** was slowed down and did not give false signals, in a trend decreases and **AMA** is fast, without delay(is relative) reacts to change of the price.

For those who not **skachal** clause, briefly I shall describe algorithm. The indicator has the period, it will be defined by quantity of bars participating in calculation of the indicator. For this period it is defined, so-called, "efficiency of movement". "Efficiency of movement" pays off as the attitude of moving to a trajectory of the price for the period. The maximal value of this factor 1, minimal 0. For example, the period 10 and all last 10 **svechej** "bull", in this case "efficiency of movement" will be equal 1. A trajectory it is counted at the price of closing. In the indicator it is established two periods of averaging(**EMA**), big and small. In these limits period **AMA** will vary depending on "efficiency of movement". I.e. the minimal period for value 1 and maximal for 0.

In external variables we shall bear period **AMA**, the boundary periods(big and small **EMA**) and the quantity of bars on which will be displayed the indicator.

19.2 Indicator

```
/*[[
Name: = AMA
Author: = forextimes
Link: = fxtest.ru
Notes: = AMA Kaufman
Separate Window: = No
First Color: = Blue
First Draw Type: = Line
First Symbol: = 217
Use Second Data: = No
Second Color: = Red
Second Draw Type: = Line
Second Symbol: = 218
]]*/
inputs:n(10), fastMA(2), slowMA(30), Nbars(500);
```

```

Variable: shift(0), k(0), Noise(0), signal
(0), i(0), AMA(0), ssc(0), er(0), AMA1(0);

SetLoopCount(0);
// loop from first bar to current bar(with shift=0)
AMA1=c[Nbars]; /* it isskustvennoe the first value of the indicator, we
equate to te price of closing */

For shift =Nbars Downto 0
Begin // the beginning rasscheta znachacheny the indicator

    signal=0; // moving
    Noise=0; // a trajectory
    signal=abs(c[shift]-c[shift+n-1]); // we calculate moving

    for i=shift To shift+n-1
    Begin
        Noise=Noise+abs(c[i]-c[i+1]); // we calculate a trajectory
    end;

    er=signal/Noise; // <efficiency of movement>
    ssc=er *(2 /(1+fastMA)-2 /(1+slowMA)) +(2 /(1+slowMA));
    // a changing smoothing constant

    // value AMA
    AMA =(c[shift] *ssc*ssc) +GetIndexValue(shift+1) *(1-ssc*ssc);
    // zngachenie AMA for the first bar
    if shift=Nbars then AMA =(c[shift] *ssc*ssc) +AMA1 *(1-ssc*ssc);
    // we bring value AMA in a file of the indicator
    SetIndexValue(shift, AMA);
End;

```

19.3 Conclusion

Different people speak about utility of this indicator miscellaneous, but his idea so simply and is logical, that it is the technical tool causes in me the big sympathy. I am confident, that there will be traders to whom this indicator is necessary as desirable.

Yours faithfully, Halhaljan Arthur.

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fxtest.ru

The original of clause - [FOREX MAGAZINE ? 20 from 07.06.2004](#)
 ◁ [[Section "Experts"](#)].. [[18](#) [[21](#)] ▷ {[20](#)} {[18](#)}

The Lesson # 20

Hello, dear readers. In the last release we wrote [AMA Kaufmana](#). Due to one of readers of magazine, under [nikom Simca](#), in a code of the indicator the mistake is found. As he was [predlozhna](#) the interesting scheme of optimization of a code. In this release the answer to a question of one of readers of magazine will be given.

20.1 Corrections of a mistake and optimization

The basic mistake will consist in calculation of a variable signal. In the last code the variable looks thus:
signal=abs(c[shift]-c[shift+n-1]);

The corrected variant looks so:
signal=abs(c[shift]-c[shift+n]);

The variable signal was considered on 1 bar less put.

Some readers can tell, that optimization of so small code is not meaningful, especially if the processor of a computer some GHz and operative memory a little [sot](#) Mb. Actually it not so to load [MT](#), that it would not display the user indicator on all history, very much it is not difficult. Especially at extremely not optimized code.

Rather not the beautiful moment of the past [kona](#) will be, that we read the last value of the indicator directly from a file of the indicator. It can be avoided easily. We know, that at [perezapuske](#) the indicator(expert) old values of variables are kept. Therefore it is easier to use a design of such kind.

[AMA](#)(new) = [AMA](#)(old) +...

I bring a part of the letter which has written to me Dear Simca.

...

Your fragment looks so:

```
AMA1=c[Nbars];
For shift=Nbars Downto 0
Begin...
AMA =(c[shift] *ssc*ssc) +GetIndexValue(shift+1) *(1-ssc*ssc);
if shift=Nbars then AMA =(c[shift] *ssc*ssc) +AMA1 *(1-ssc*ssc);
SetIndexValue(shift, AMA);
End;
```

I would write the same here so:

```
AMA=c[Nbars];
For shift=Nbars Downto 0
```

```

Begin...
AMA =(c[shift] *ssc*ssc) +AMA *(1-ssc*ssc);
SetIndexValue(shift, AMA);
End;

```

On mine so it is easier. :) there is no sense to take previous value AMA from a file, it and so it will be kept from the previous cycle. And initial value which you set through variable AMA1 and check on each iteration, it is possible simply up to a cycle initially to appropriate variable AMA. The essence will not change, and the algorithm will considerably be simplified. Variable AMA1 in this case is absolutely not necessary.

:)..

But on it Dear Simca has not stopped, I bring the citation of the following letter.

...

In general, my algorithm of the indicator after the made changes looked as follows:

```

Inputs: Range(10), FastMA(2), SlowMA(30);
Variables: cb(0), i(0), Noise(0), ER(0), SSC(0), AMA(0);

SetLoopCount(0);
AMA=Close[Bars-Range];
for cb=Bars-Range-1 downto 0 begin
Noise=0;
for i=cb to cb+Range-1 begin
Noise=Noise+Abs(Close[i]-Close[i+1]);
end;
ER=Abs(Close[cb]-Close[cb+Range])/Noise;
SSC=ER *(2 /(FastMA+1)-2 /(SlowMA+1)) +2 /(SlowMA+1);
AMA=Close[cb] *SSC*SSC+AMA *(1-SSC*SSC);
SetIndexValue(cb, AMA);
end;

```

As you can see, I do not use " quantity of bars on which the indicator "(Nbars) and **otobrazhaju** it on all an accessible range of bars is displayed. It certainly a question not basic, simply my computer. Has perfectly time to count all range. :)

Instead of shift I have got used to write cb(reduction from CurrentBar). :) I think Bars from (Bars-Range-1) that on an internal cycle to not jump out for limits of quantity of bars.

Accordingly for first value AMA has taken the price of a bar before the first considered(Bars-Range). signal I did not begin to describe a variable separately and have transferred directly to calculation ER because she all the same is not used anywhere more. We have already discussed the everything else. :) in general here and so all clearly and especially to describe there is nothing. :)

Now we shall actually pass to perfection of that that is. We shall begin with calculation SSC. With open years it is visible that in it a heap of considered parameters not dependent on variables of a cycle. Logical will calculate them once up to a cycle and inside to use ready values. I here invent nothing, all this actually was in clause.

$2 / (\text{SlowMA} + 1)$ - represents so-called "SlowSC"(the term from clause).

$2 / (\text{FastMA} + 1)$ is "FastSC".

As inside a cycle actually "FastSC" us does not interest, and difference FastSC-SlowSC is important only, we shall use two preliminary (before a basis cycle) the calculated factor:

```
k1=2 / (SlowMA+1);  
k2=2 / (FastMA+1)-k1;
```

After that calculation SSC gets considerably shorter (and the main thing faster :) a kind):

```
SSC=ER*k2+k1;
```

Further. At calculation AMA in a classical kind too many operations of multiplication (unjustified luxury) are used. :) Means we shall transform the formula to more comprehensible kind(will be considered faster). The kind of transformation is in clause but if it is not obvious, I shall paint with it more in detail:

Price - price Close[cb.]

AMA1 - previous value AMA(but we remember:) that it will be possible to use simply AMA from the last iteration of a cycle).

```
AMA=Price*SSC^2+AMA1 *(1-SSC^2);
```

we shall open brackets

```
AMA=Price*SSC^2+AMA1-AMA1*SSC^2;
```

we shall rearrange elements for convenience

```
AMA=AMA1+Price*SSC^2-AMA1*SSC^2;
```

well also we shall put outside the brackets SSC^2

```
AMA=AMA1+SSC^2 *(Price-AMA1)
```

Now calculation AMA looks like:

```
AMA=AMA+SSC*SSC *(Close[cb]-AMA);
```

Here this another matter :) only two multiplication and additions has not increased. :)

This kind of the formula by the way too in clause was.

Well here like all that would be possible soptimizirovali. At least so it seemed to me.

Total have received the indicator in the following kind:

```
Inputs: Range(10), FastMA(2), SlowMA(30);  
Variables: cb(0), i(0), k1(0), k2(0), Noise(0), ER(0), SSC(0), AMA(0);  
  
SetLoopCount(0);  
k1=2 / (SlowMA+1);  
k2=2 / (FastMA+1)-k1;  
AMA=Close[Bars-Range];
```

```

for cb=Bars-Range-1 downto 0 begin
Noise=0;
for i=cb to cb+Range-1 begin
Noise=Noise+Abs(Close[i]-Close[i+1]);
end;
ER=Abs(Close[cb]-Close[cb+Range])/Noise;
SSC=ER*k2+k1;
AMA=AMA+SSC*SSC*(Close[cb]-AMA);
SetIndexValue(cb, AMA);
end;

```

Finally to make sure that all of us have made correctly (in fact we only optimized algorithm not changing his essence) we start on the schedule for both indicators simultaneously. We see full absolute concurrence of curves. Optimization means is correct. :) But the second variant will work faster... Adequately imitations!

I want to repeat one of the main moments of optimization. $AMA(\text{new}) = AMA(\text{old}) + \cdot$. It allows to not read out the last value of the indicator from a file. Since using in the formula the last value of the is not not enough indicators, it would be useful for all to take on arms this, simple and convenient, reception.

20.2 Answer to a question

Dear Jury asks.

... How to make that the counselor closed a position (if those *imeetsja*) on the given tool at the moment of closing a bar and entered into the market at the moment of formation of the following new bar...

MT "does not understand", that just about the bar will be closed. But *MT* knows precisely time. From this also we shall proceed.

Here a part of a code which closes a position before closing of bar II. By analogy for opening a position, I think, you can make.

```

if Minute=59 then
{
  if TotalTrades> 0 then
  {
    for cnt=1 to TotalTrades
    {
      if OrderValue(cnt, VAL_TYPE) <=OP_SELL and
      OrderValue(cnt, VAL_SYMBOL) =Symbol then
      {
        If OrderValue(cnt, VAL_TYPE) =OP_BUY then
        {
          CloseOrder(OrderValue(cnt, VAL_TICKET),
            OrderValue(cnt, VAL_LOTS), Bid, 3, Violet);
        }
      }
    }
  }
}

```


The Lesson # 21

Hello dear readers. This week to me there has come a plenty of questions from you, therefore this lesson will be completely devoted to answers to your questions.

21.1 Question-answer

Andrey Sirotkin has sent 2 interesting questions.

*... 1. I would want that the expert traded on the certain pair, but I could play manually on another. In the expert the input is carried out under condition of if TotalTrades <1 then {
But because, I open a position manually on other pair, the input in the expert cannot be carried out (in fact if TotalTrades already =1) on pair to which the expert is attached.
What it is possible to make?...*

The answer:

```
/*[[
  Name: = test
  Lots: = 1.00
  Stop Loss: = 0
  Take Profit: = 0
  Trailing Stop: = 0
]]*/
var: cnt(0), tt(0);

for cnt=1 to totaltrades
{ if OrderValue(cnt, VAL_SYMBOL) =Symbol then
  tt=tt+1;
};

if tt=0 then {...
```

Thus, we count up only quantity of positions open on pair on which the expert is established. The input is carried out under condition of tt=0 and the quantity of positions on other pairs can be anyone.

... 2. whether it is possible to make, so the expert would understand, what transactions were opened by it and what were opened by me? It is necessary for an opportunity of trade in the expert and hands on one pair...

The answer:

Special identifiers for open positions in **MT** are not present. For identification of positions it is convenient to use the size **lota** (from those **DTS** where the fractional sizes are supported). For example, you play manually 1 **lotom** then the expert on same pair, you can trade 1.1 **lota** or 0.9.

The MM strongly will not suffer from it, though, certainly, this far-fetched the decision, but remains nothing.

```
var: cnt(0), tt(0);
for cnt=1 to totaltrades {if OrderValue(cnt, VAL_SYMBOL) =Symbol and
OrderValue(cnt, VAL_LOTS) =lots then tt=tt+1;};
```

Similarly on the first case, but elimination of open positions goes also on the size **lota**.

Alexander A. asks.

*... Whether I can close a part of an open position, for example after achievement certain **profita**?...*

The answer:

Yes it is possible, but not in all **DTS**.

The code of the expert will be about such:

```
lot=0.5;
for cnt=1 to TotalTrades
{
  if OrderValue(cnt, VAL_TYPE) <=OP_SELL and
  OrderValue(cnt, VAL_SYMBOL) =Symbol then
  {
    If OrderValue(cnt, VAL_TYPE) =OP_BUY then
    {
      if (bid-OrderValue(cnt, VAL_OPENPRICE))> 20*point then
      {
        CloseOrder(OrderValue(cnt, VAL_TICKET), lot, Bid, 3, Violet);
        Exit;
      };
    };
    If OrderValue(cnt, VAL_TYPE) =OP_SELL then
    { if (OrderValue(cnt, VAL_OPENPRICE)-ask)> 20*point then
      {
        CloseOrder(OrderValue(cnt, VAL_TICKET), lot, ask, 3, Violet);
        Exit;
      };
    };
  };
};
};
```

```
CloseOrder(OrderValue(cnt, VAL_TICKET), lot, Bid, 3, Violet);
```

In the given function the fourth parameter a variable lot, do not confuse her to the registered variable lots. In a variable lot earlier in a code of the expert we also determine, what part of a position to close. It is necessary to remember one moment, using the given campaign, it is necessary to limit closing of a part of a position by an once.

Till now there come questions about **tajmaute**. Readers are Dear before asking questions, persuasively I recommend to read through all releases of magazine.

For observance **tajmauta** (10 second restriction **DTS**) after opening a position, it is necessary to use the following sheaf in the beginning of the expert.

```
if curtime-LastTradeTime <11 then exit;
```

Yours faithfully, Halhaljan Arthur.

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