

## Question One

```

function [Table2,ma_s,ma_l] = Data(Symbol,short,long)
    IBdat = IBMatlab('action','history','symbol',Symbol,'barSize','3 mins',
'useRTH',1,'DurationValue',1,'DurationUnits','D','EndTime','
'20190308 16:00:00')
    Table = transpose(IBdat.close);
    Time = transpose(IBdat.dateTime);

for i = 1:100
    newIBdat = IBMatlab('action','history','symbol',Symbol,'barSize','3
mins','useRTH',0);
    newTable = transpose(newIBdat.close);
    Table2 = vertcat(Table,newTable);
    ma_s = movmean(Table2,short);
    ma_l = movmean(Table2,long);

    NewTime = transpose(newIBdat.dateTime);
    Time2 = vertcat(Time,NewTime);

    buy = [];
    sell = [];
% find out golden folk
for i = 3:length(Table2)
    if ma_s(i-1) < ma_l(i-1) && ma_s(i) >= ma_l(i)
        buy = [buy;i];
    elseif ma_s(i-1) > ma_l(i-1) && ma_s(i) <= ma_l(i) && ~isempty(buy) &&
length(buy)>length(sell)
        sell = [sell;i];
    end
end

% if we still have stock on hand, we could sell it in the end
if length(buy) > length(sell)
    sell= [sell:length(Table2)];
elseif length(buy) < length(sell)
    sell = sell(1:length(buy)-1);
end

for i = 1:length(sell)
    r(i) = ((Table2(sell(i)) - Table2(buy(i))) ./ Table2(buy(i)))+1;
end
% find out cummulated return
total_r= cumprod(r);
onemonth_return = total_r(end)
% plot return
ax(1) = subplot(2,1,1);
plot(total_r);grid on;
legend('Return');
title(['Return of MA Model']);
ax(2) = subplot(2,1,2);
y = cat(2,Table2,ma_s,ma_l);
plot(1:length(Table2),y);
title(['Closing Price']);grid on;
legend('Close','Lead','Lag');
xticklabels(Time2);

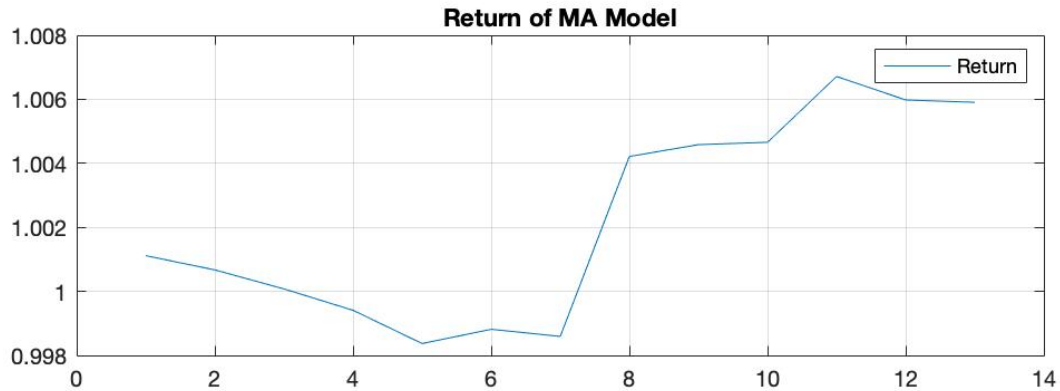
```

```

pause(10); % in order to debug, I shorted the time period of renew the data
end
end

```

```
>> [a,b,c] = Data("IBM",3,20);
```



IBdat =

struct with fields:

```

dateNum: [1×130 double]
dateTime: {1×130 cell}
open: [1×130 double]
high: [1×130 double]
low: [1×130 double]
close: [1×130 double]
volume: [1×130 double]
count: [1×130 double]
WAP: [1×130 double]
hasGaps: [1×130 logical]

```

onemonth\_return =

1.0063

onemonth\_return =

1.0063

## Question Two

```
function [buy,sell] = breakdata(Symbol,short,long,capital)
    IBdat = IBMatlab('action','history','symbol',Symbol,'barSize','3 mins',
    'useRTH',1,'DurationValue',1,'DurationUnits','D','EndTime','
    '20190308 16:00:00') ;
    Table = transpose(IBdat.close);
    Time = transpose(IBdat.dateTime);
    for i = 1:100
        newIBdat = IBMatlab('action','history','symbol',Symbol,'barSize','3
    mins','useRTH',0);
        newTable = transpose(newIBdat.close);
        Table2 = vertcat(Table,newTable);
        ma_s = movmean(Table2,short);
        ma_l = movmean(Table2,long);

        NewTime = transpose(newIBdat.dateTime);
        Time2 = vertcat(Time,NewTime);

        buy = [];
        sell = [];
        % find out golden folk
        for i = 3:length(Table2)
            if ma_s(i-1) < ma_l(i-1) && ma_s(i) >= ma_l(i)
                buy = [buy;i];
            elseif ma_s(i-1) > ma_l(i-1) && ma_s(i) <= ma_l(i) && ~isempty(buy) &&
            length(buy)>length(sell)
                sell = [sell;i];
            end
        end

        % if we still have stock on hand, we could sell it in the end

        if length(buy) > length(sell)
            sell= [sell;length(Table2)];
        elseif length(buy) < length(sell)
            sell = sell(1:length(buy)-1);
        end

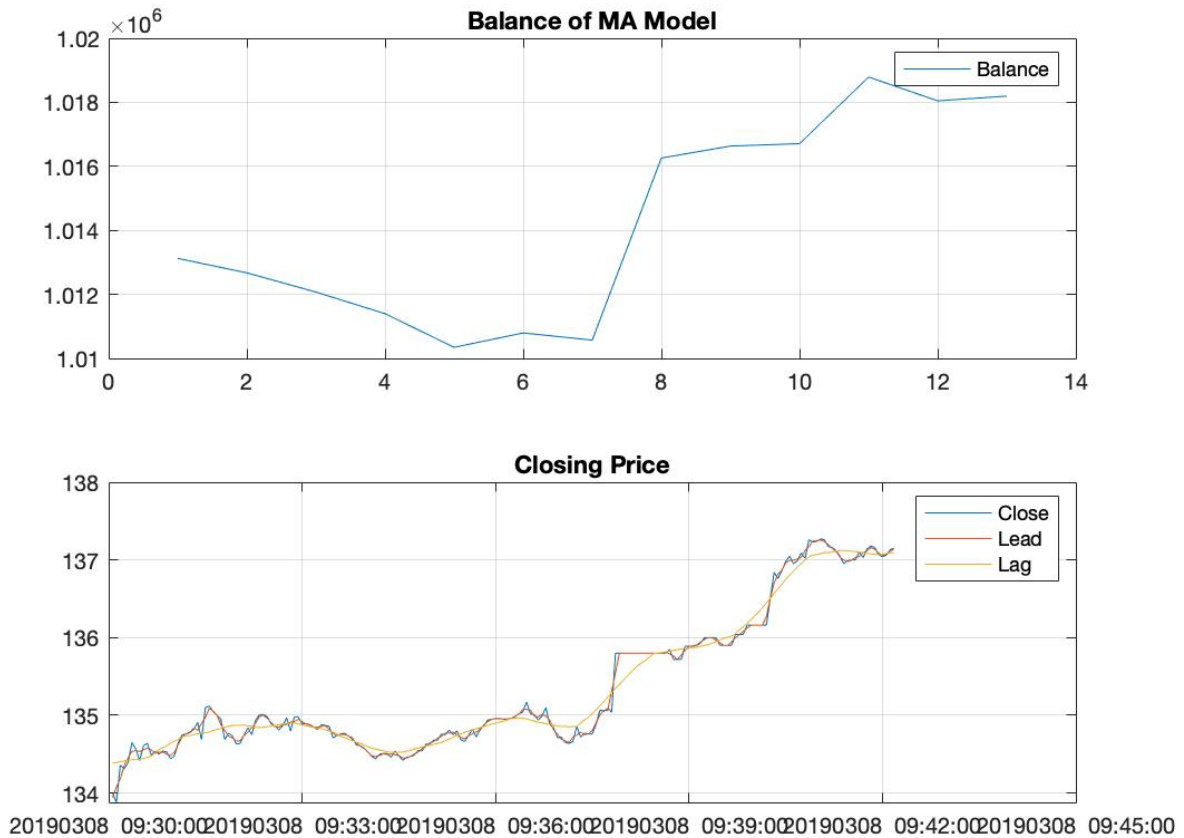
        a = 1
        capitalNew = [];
        while a <= length(sell)
            share = capital./Table2(buy(a));
            balance = (Table2(sell(a)) - Table2(buy(a)))*share+capital
```

```
capitalNew(a) = balance
capital = balance
a = a+1
if balance == 1000000*0.1
    break
end
% plot return
ax(1) = subplot(2,1,1);
plot(capitalNew);grid on;
legend('Balance');
title(['Balance of MA Model']);
ax(2) = subplot(2,1,2);
y = cat(2,Table2,ma_s,ma_l);
plot(1:length(Table2),y);
title(['Closing Price']);grid on;
legend('Close','Lead','Lag');
xlabel(Time2);

end

pause(10); % in order to debug, I shorted the time period of renew the data
end
end
```

```
>> [a,b]=breakdata("IBM",3,20,1000000);
```



```
balance =
```

```
1.1223e+06
```

```
capitalNew =
```

```
1.0e+06 *
```

```
Columns 1 through 8
```

```
1.1165 1.1160 1.1153 1.1146 1.1134 1.1139 1.1137 1.1199
```

```
Columns 9 through 13
```

```
1.1204 1.1204 1.1227 1.1219 1.1223
```

```
capital =
```

1.1223e+06

a =

14