

Question 1

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function onemonth_return=ma_strategy(data,short,long)
% data for what we downloaded from IB
% short for short moving average window
% long for long moving average window
data_close = data.close;
data_Time = transpose(data.dateTime);
data_Time = cell2mat(data_Time);
% calculate moving average for short window and long window
ma_s = movmean(data_close,short);
ma_l = movmean(data_close,long);
% define buy and sell
buy = [];
sell = [];
% find out golden folk
for i = 5:length(data_close)
    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)
        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(data_close)];
elseif length(buy) <= length(sell)
    sell = sell(1:length(buy));
end
% find out return with simple return method
r = ((data_close(sell) - data_close(buy)) ./ data_close(buy))+1;
% find out cummulated return
total_r= cumprod(r);
onemonth_return = total_r(end)
fprintf('Cumulative return for MA(%d,%d) in last month\n',short,long,total_r(end));
% plot the gain and loss line picture
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 = [data_close;ma_s;ma_l]';
plot(1:length(data_close),y);
title(['Closing Price']);grid on;
legend('Close','Lead','Lag');
xticklabels(data_Time);

end

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```
data1 = IBMatlab('action','history', 'symbol','IBM',
'barSize','1 min', 'useRTH',1 , 'DurationValue',60,
'DurationUnits', 'D' )
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>> ma_strategy(data1,5,10);
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onemonth_return =
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1.1293
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Cumulative return for MA(5,10) in last month is 1.1293 %



Question 2

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function
[KValue,DValue,JValue,buy,sell,onemonth_return]=KDJ(data,High,Low,Close,N,M,L
,S)
% when K&D over 80, sell it
% when K&D less 20, buy it
% when J over 100, sell it
% when J less 0, buy it

% Close- the close price of one bar
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% N - window say 14
% M - parameter for calculate K, say 3
% L - parameter for calculate D, say 3
% S - parameter for calculate J, say 3

% adjust data
data_close = data.close;
data_new = transpose(data.close);
data_Time = transpose(data.dateTime);
data_Time = cell2mat(data_Time);

RSV=zeros(length(High),1);
KValue=zeros(length(High),1);
DValue=zeros(length(High),1);
JValue=zeros(length(High),1);
RSV(1:N-1)=50;
KValue(1:N-1)=50;
DValue(1:N-1)=50;
% calculate KD
for i=N:length(High)
    RSV(i)=(Close(i)-min(Low(i-N+1:i)))/(max(High(i-N+1:i))-min(Low(i-
N+1:i)))*100;
    KValue(i)=(M-1)/M*KValue(i-1)+1/M*RSV(i);
    DValue(i)=(L-1)/L*DValue(i-1)+1/L*KValue(i);
end
% calculate J
JValue=S*DValue-(S-1)*KValue;
buy = [];
sell = [];

% strategy for buy and sell
for i = 1:length(data_close)
    if KValue(i) <= 20 && DValue(i) <= 20 && JValue(i) < 0
        buy = [buy;i];
    elseif KValue(i) >= 80 && DValue(i) >= 80 && JValue(i) > 100 &&
~isempty(buy)
        sell = [sell;i];
    end
end

% if buy signal larger than sell signal, we should sell all stock in the
% end, otherwise, end the sell at the same position of buy
if length(buy) >= length(sell)
    sell= [sell:length(data_close)];
elseif length(buy) <= length(sell)
    sell = sell(1:length(buy));

end
% find out return with simple return method
r = ((data_close(sell) - data_close(buy)) ./ data_close(buy))+1;
% find out cummulated return
total_r= cumprod(r);
onemonth_return = total_r(end)
% plot the cummulated return
figure(1)
ax(1) = subplot(2,1,1);
plot(total_r);grid on;

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legend('Return');
title(['Return of KDJ Model']);
ax(2) = subplot(2,1,2);
y = [data_new,KValue]';
plot(1:length(data_close),y);
title(['Closing Price']);grid on;
legend('Close','K');
xticklabels(data_Time);
% plot the KDJ line
figure(2)
y = [data_new,KValue,DValue,JValue]';
plot(1:length(data_close),y);
title(['Closing Price']);grid on;
legend('Close','K','D','J');
xticklabels(data_Time);
end
>> [a,b,c,d,e,f] = KDJ(data1,data1.high,data1.low,data1.close,14,3,5,5);

onemonth_return =

    1.1661

```



