1 Problem 1

```
clear;clc;
% Main Program
a = 1;
b = 0;
c = 1;
[x1,x2,flag] = quadform(a,b,c)

function [A1,A2,Flag] = quadform(a,b,c)
A1 = ((-b) + sqrt((b^2)-(4*a*c)))/(2*a);
A2 = ((-b) - sqrt((b^2)-(4*a*c)))/(2*a);
if (isnan(A1) && isnan(A2)) % a = 0, b = 0, c = 1
    Flag = 'No zeros exist';
elseif ((b^2)-(4*a*c)) < 0 % a = 1, b = 0, c = 1
    Flag = 'Only imaginary roots found';
elseif (a == 0 && b == 0) && (c == 0)
    Flag = 'Any value of x is a solution';
elseif ((b^2)-(4*a*c)) == 0 % a = 1, b = 2, c = 1
    Flag = 'Only one root is found';
else Flag = 'No errors'; % a = 1, b = 2, c = 0
end
end
% What happends when a = 0?
% What type of equation do we have when a = 0 and how can
% I solve for the root?
```

2 Problem 2

```
clear;clc;
% Main Program
N = 15485863;
[answer,primefactors] = primey(N);
fprintf('Is %i a prime? %s \n', N, answer)
fprintf('The primefactors of %i are: \n' , N)
fprintf('%i \n' , primefactors)
N = 12345678;
[answer,primefactors] = primey(N);
fprintf('Is %i a prime? %s \n', N, answer)
fprintf('The primefactors of %i are: \n' , N)
fprintf('%i \n' , primefactors)

function [Answer,Prime_Factors] = primey(N)
A = 2;
D = N;
Count1 = 1;
while D>1
    if rem(D,A) == 0
        Answer = 'No';
        Prime_Factors(Count1) = A;
        Count1 = Count1 + 1;
        D = D/A;
    elseif rem(D,A) ~= 0
        A = A + 1;
    end
end
if  A == N
    Answer = 'Yes';
    Prime_Factors = [1;N];
end
end
% Can you clearly explain what I am doing here?
% If not, go through the code line by line and do
% a few of the loop iterations by hand.
```

3 Problem 3

```
clear;clc;
% Main Program
a = -1;
b = 1;
c = -1;
d = 10;
A = 0;
B = 5;
[root,flag] = bisect(a,b,c,d,A,B)

function[root,flag] = bisect(a,b,c,d,A,B)
x = (A+B)/2;
fx = a*x^3+b*x^2+c*x+d;
fa = a*A^3+b*A^2+c*A+d;
fb = a*B^3+b*B^2+c*B+d;

if fa > 0 && fb > 0 % A = 0, B = 1
    root = 'None';
    flag = 'No roots exists on the interval [A,B]';
elseif fa < 0 && fb < 0 % A = 3, B = 4
    root = 'None';
    flag = 'No roots exist on the interval [A,B]';
else
    while x ~= A && x ~= B
    if fx*fb < 0
        A = x;
    elseif fx*fa < 0
        B = x;
    end
    x = (A+B)/2;
    fx = a*x^3+b*x^2+c*x+d;
    fa = a*A^3+b*A^2+c*A+d;
    fb = a*B^3+b*B^2+c*B+d;
    root = x;
    flag = 'The root exists';
    end
end
end
```