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BSCS – 6A

180459

Task: 01:

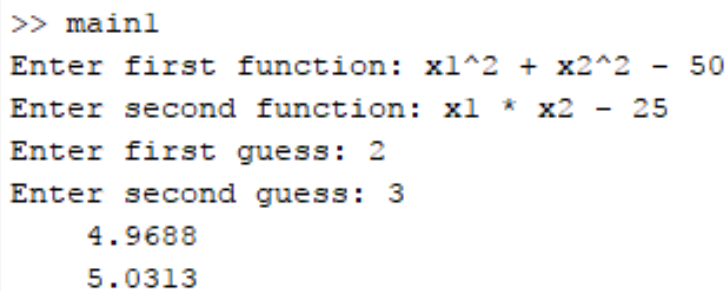
Function:

```
function [root] = newton_raphson(f, r, J)
syms x1 x2;
for i=1:4
    J_inv = inv(double(subs(J,[x1; x2], r)));
    val = double(subs(f,[x1; x2], r));
    val = val';
    root = r - J_inv * val;
    r = root;
end
```

Main:

```
syms x1 x2
g1 = input('Enter first function: ');
g2 = input('Enter second function: ');
g1 = symfun(g1,[x1; x2]);
g2 = symfun(g2,[x1; x2]);
f = [g1, g2];
J = jacobian(f,[x1; x2]);
r1 = input('Enter first guess: ');
r2 = input('Enter second guess: ');
r = [r1; r2];
root = newton_raphson(f,r,J);
disp(root)
```

Screenshot:



```
>> main1
Enter first function: x1^2 + x2^2 - 50
Enter second function: x1 * x2 - 25
Enter first guess: 2
Enter second guess: 3
    4.9688
    5.0313
```

Task: 2:

Code:

```
x=[0 1 2 3 4 5 6 7 8];
y=[40.12 66.78 80.17 86.71 80.77 66.78 44.41 10.51 -32.60];
pc = polyfit(x,y,2);
plot(x,y,'ro');
hold on;
plot(x,polyval(pc,x),'b-');
txt = sprintf('Best fit curve y=%.2fx^2 + %.2fx + %.2f',pc(1),pc(2),pc(3));
legend('Data points',txt);
txt = sprintf('Best fit curve y=%.2fx^2 + %.2fx + %.2f',pc(1),pc(2),pc(3));
disp(txt);
y1 = polyval(pc,2);
y2 = polyval(pc,3);
slope = (y2 - y1);
txt = sprintf('slope = %.2f',slope);
disp(txt);
txt = sprintf('intercept = %.2f',pc(3));
disp(txt);
y1 = polyval(pc,4.5);
y2 = polyval(pc,8.5);
txt = sprintf('value at x = 4.5, y = %.2f',y1);
disp(txt);
txt = sprintf('value at x = 8.5, y = %.2f',y2);
disp(txt);
```

Screenshot:

```
>> main2
Best fit curve y=-4.84x^2 + 29.51x + 40.89
slope = 5.33
intercept = 40.89
>> main2
Best fit curve y=-4.84x^2 + 29.51x + 40.89
slope = 5.33
intercept = 40.89
value at x = 4.5, y = 75.74
value at x = 8.5, y = -57.75
```

