HW4

```
function infSqWell2D(nx, ny)

if ((mod(nx,1) ~= 0) || (nx < 0)) || ((mod(ny, 1) ~= 0) || (ny < 0))

    error("nx and ny must be positive integer ")
elseif (nx > 5) || (ny > 5)
    error("nx and ny are both not exceeding 5")
else
    L = 1;
    [a,b] = meshgrid(0:0.01:1,0:0.01:1);
    f1 = @(a,b) (2/L).*sin(nx*pi.*a/L).*sin(ny*pi.*b/L);
    c = f1(a,b);
    surf(a,b,c);
    hold on
    contour(a,b,c.^2)
    legend('Wave Function', 'Probability Density');
    m = 1;
    hbar = 1.05*10^-34;
    e = (nx^2+ny^2)*pi^2*hbar^2/(2*m*L^2);
    fprintf('Energy = %g\n',e)
    for n = 1:nx
        for h = 1:ny
            [l,s] = fminsearch(@(l)-f1(l(1),l(2)).^2,[(2*n-1)/(2*nx),(2*h-
1)/(2*ny)]);
        disp(l)
        end
    end
end
end
```

```
>> infSqWell2D(1.5,5)
Error using infSqWell2D
nx and ny must be positive integer
```

```
>> infSqWell2D(1.5,10)
Error using infSqWell2D
nx and ny must be positive integer
```

Command Window

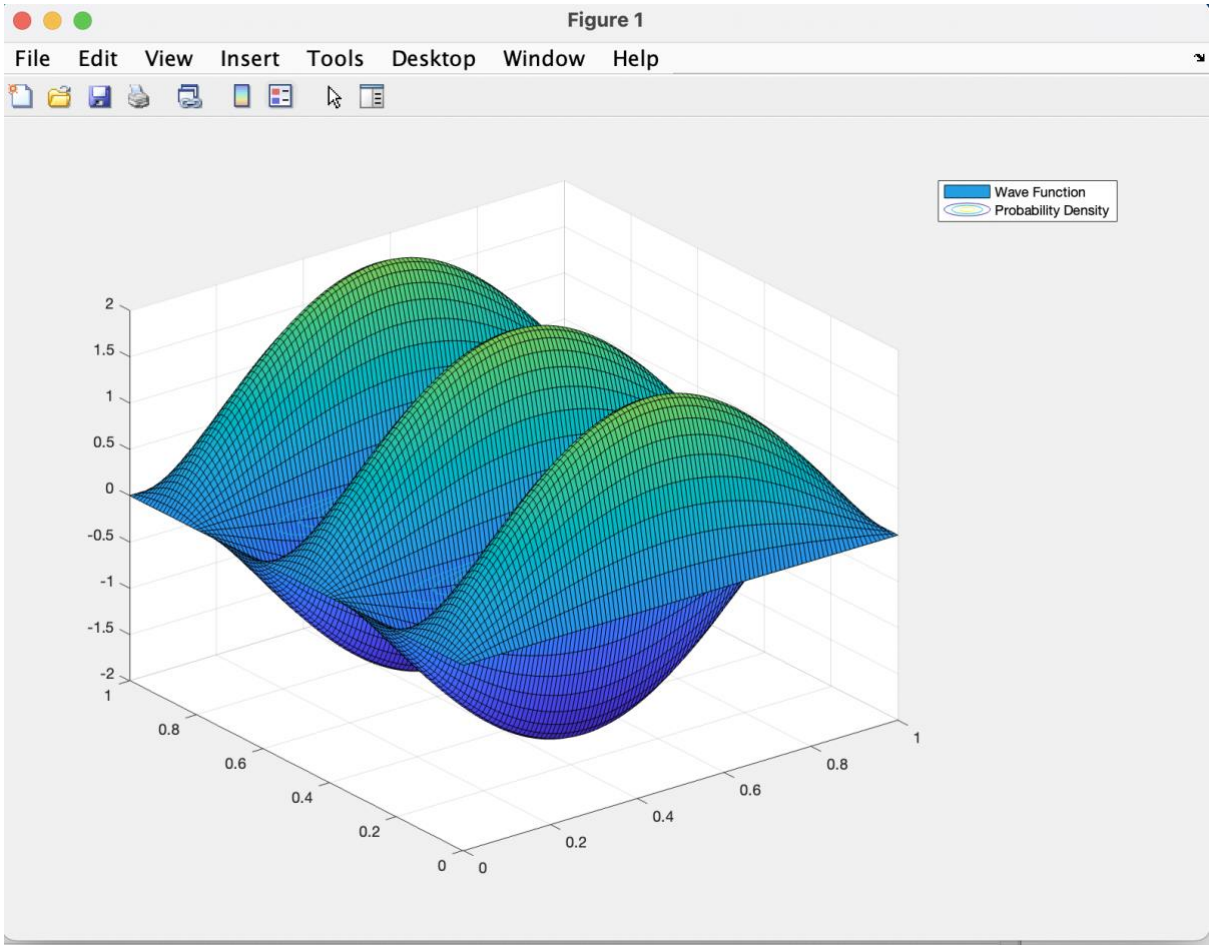
```
>> infSqWell2D(1,5)
Energy = 1.41456e-66
    0.5000    0.1000

    0.5000    0.3000

    0.5000    0.5000

    0.5000    0.7000

    0.5000    0.9000
```




```
Command Window
>> infSqWell2D(2,3)
Energy = 7.07281e-67
    0.2500    0.1667

    0.2500    0.5000

    0.2500    0.8333

    0.7500    0.1667

    0.7500    0.5000
```

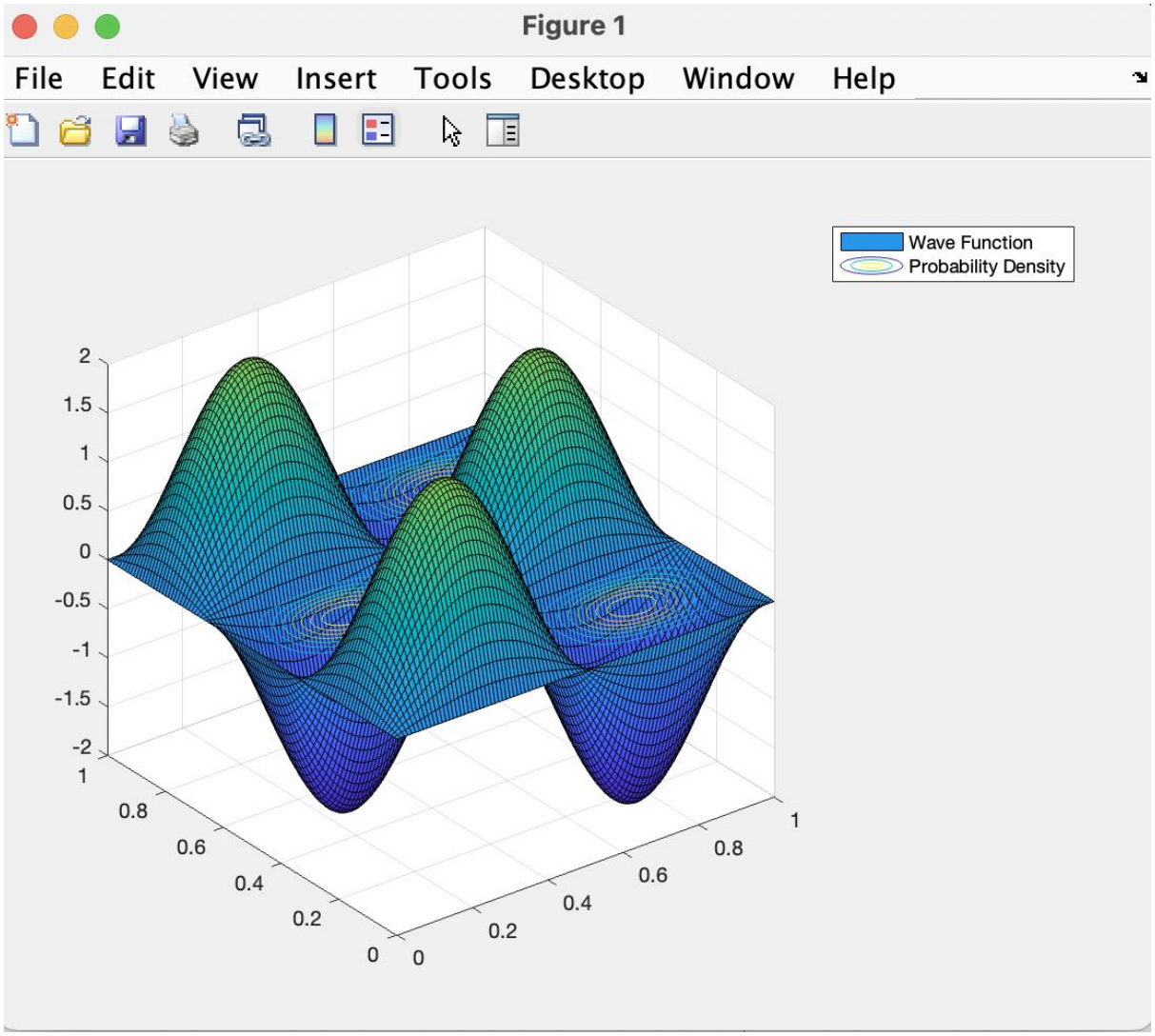


Figure 1
File Edit View Insert Tools Desktop Window Help
Wave Function
Probability Density
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1

Command Window

```
>> infSqWell2D(3,3)
Energy = 9.79311e-67
    0.1667    0.1667

    0.1667    0.5000

    0.1667    0.8333

    0.5000    0.1667

    0.5000    0.5000

    0.5000    0.8333

    0.8333    0.1667

    0.8333    0.5000

    0.8333    0.8333

>>
```

Figure 1

File Edit View Insert Tools Desktop Window Help