In this assignment, we have to draw the wave functions and the probability of presence, of course we print the energy values in each level.

First, we observe the energy values for 4 levels:

```
% Calculate and print the expression E_n = E0 * userNumber^2
En = E0 * n^2;
disp(['E_' num2str(n) ' = ' char(En)]);
```

```
Enter a number of energy level: 4
E_1 = E0
E_2 = 4*E0
E_3 = 9*E0
E_4 = 16*E0
```

Now, based on what was discussed in the class, we drew the wave functions (of course, the code is also given below).

```
% Sine function with changing formula based on userNumber
y = sqrt(2/L)*sin(n*pi*x/L);
```

```
% Create subplots
subplot(userNumber, 2, (n-1)*2 + 1);
fplot(y, [0, L]);
title(['Wave Function, n = ' num2str(n)]);
xlabel('x');
ylabel(['sin(' num2str(n) '\pix/' num2str(L) ')']);
grid on;

subplot(userNumber, 2, (n-1)*2 + 2);
fplot(y^2, [0, L]); % Plot y^2 for the product with the conjugate
title(['Probability of Attendance, n = ' num2str(n)]);
xlabel('x');
ylabel(['sin(' num2str(n) '\pix/' num2str(L) ')^2']);
grid on;
```

As it is clear, since we have to get the probability, we have to use the $\int_0^L \psi\psi^*$ formula: