

If you are using a jupyter notebook (recommended), then keep all your programs in a single notebook. A good programming style is to define a function for one task with clearly defined input (arguments) and output. For plots you may use matplotlib (if you are using python) or gnuplot (if you are using c or fortran) or LsqFit module if you are using Julia.

If you are planning to submit separate programs, then please follow the guideline below:

- Keep all files of a worksheet in a single folder.
 - Follow a systematic naming convention. You may name the program files as Q1.py or Q1a.py, Q1b.py for question 1 (if you have created multiple files for a single question). The data file should be named as Q1-data-a.dat and so on.
 - Finally compress the entire folder as a single .zip or .tgz (using `tar cvfz archive.tgz folder-name/`, and submit the file in WeLearn.
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1. (20 points) Find the eigenvalues and eigenfunctions for the bound state solutions of Schrödinger equation for the following potentials.

(a) (10 points)

$$V(x) = \begin{cases} 0, & \text{for } |x| > 1.0 \\ -V_0(1 - x)/2, & \text{for } |x| \leq 1 \end{cases}$$

where, $V_0 = 40$

(b) (10 points)

$$V(x) = x^2.$$