Save your work under the test3 folder on your K: drive. Since solving these problems may take more than one script, create a separate subfolder for each of the questions. The first two questions are by hand. The remaining are on the computer.

1. [4 points] Let $f\left(x\right)=x^{2}-2$, and the initial interval for the location of a root be $[0,2]$. Write out the first three subdivisions the bisection method would use to find the root.

|  |  |  |  |
| --- | --- | --- | --- |
| $$a$$ | $$f(a)$$ | $$b$$ | $$f(b)$$ |
| 0 | -2 | 2 | 2 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. [4 points] Use Gaussian elimination to solve the system of equations $Ax=b$, where $A=\left[\begin{matrix}1&0&0\\1&0&1\\0&1&2\end{matrix}\right]$, $b=\left[\begin{matrix}1\\1\\1\end{matrix}\right]$, and $x$ is a column vector of three unknowns.
2. [6 points] Use a root-finding method to find the positive root in problem 1 using matlab. Save your work under the **q3** folder of the **test3** test.
3. [4 points] Use matrix notation to solve the system of equations in problem 2 using matlab. Save your work under the **q4** folder of the **test3** test.
4. [12 points] Write a matlab function called **graphit** in **graphit.m** of the **q5** folder of the **test3** test. Graphit has three arguments: a vector of **x** values, a vector of **y**, values and a polynomial degree **d**. When called graphit will fit a polynomial of the given degree through the given data points, and draw a graph of the sample points as blue squares, and a green solid line representing the best fit curve. The range of x-values for the curve should be the minimum value through the maximum value of the x vector. For example,

x=[1 1.5 3 5 7];

y=[2 4 5 8 12];

graphit(x,y,3);

 should produce a graph very similar to the following:

 