Read: all of Chapter 5

Handwork problems:

HW2_1 : Find the largest root of $f(x) = x^3 + 12x^2 - 100x - 6;$ using a) bisection method b) false position method. For both cases use an initial interval [5, 6], and e_s = 0.5% (2 sig fig accuracy). Present your results in tabular forms (shown below, add rows as needed). Retain 5 decimal places in your calculations. Also show your calculations for first two iterations below the respective tables.

(a) Bisection:

a	*f(a)*	*b*	*f(b)*	*m*	*ea (%)*	*f(m)*
5		6				

(b) False position:

xl	*f(xl)*	*xu*	*f(xu)*	*xr*	*ea (%)*	*f(xr)*
5		6				

After completing the above calculations take the quiz, 'HW2_1 Quiz' on Bb and enter the results according to the questions. Also upload a clear picture of your work using link, 'HW2_1 handwork image'.

Coding problems:

HW 2_2 This problem will be done in two parts.

(a) First write a function M file `bisection.m` that solves equation f(x)=0 using bisection method. The function uses three inputs: i) function handle for the root finding function, ii) an initial interval that brackets the root, and iii) the stopping condition.
The output is the root of the equation in the interval provided by the input.
Validate input: Generate an error message at the beginning of the code to stop it from running further if the user supplies an invalid starting interval which does not include the root.

Use the following template:

```
function root = bisection( f, interval, es)
  % implements bisection method
  % root = bisection( f, interval, es)
  % INPUT   f: function handle for the root finding function f(x)
  %          interval: an array of two elements that bracket the solution of f(x) = 0
  %          es: stopping condition
  % OUTPUT   root: the solution of equation f(x)=0
```

For example: For finding the cube root of 2, the equation to be solved is x^3 = 2

```
>> f=@(x)x.^3-2; % root finding function
>>
>> bisection(f,[1 1.5], 0.05)

ans =

    1.2603

>> bisection(f,[0 1], 0.05)
Error using bisection (line 13)
Use a bracketing interval
```

Use the above examples as two sample cases and publish & upload the pdf on Blackboard.

(b) Determine the two roots of $f(x) = 2x\cos(2x) - (x-2)^2$ accurate to 4 sig figs.

Write a **script** that will use your **`bisection.m`** written in subpart (a). Use `fprintf` to print the results to screen and plot these solution points on the graph with red star markers. Publish to generate pdf and submit on Blackboard.

HW2_3 The velocity of a falling parachutist is given by $v = \frac{gm}{c}(1 - e^{-\left(\frac{c}{m}\right)t})$

where the drag coefficient, *c*=15 kg/s, and *g* is acceleration due to gravity. Compute the mass, *m* of the parachutist so that the velocity, *v*=36 m/s at *t* = 10 seconds.
Write a **script** file & implement the **false position** algorithm to answer the question correct to 4 sig figs. *S*elect your own initial guesses. Print the answer using `fprintf`. Publish to generate pdf and submit on Blackboard.