

Technical Informatics I

Assignment 5

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Technical Informatics 1: Dr Fatimah

Assignment 5

- Aims
 - Familiarise students with functions and arrays
- Expected Outcomes
 - Students are able write a code that contains a user-defined function, arrays and apply all programming concepts that has been learnt
- References
 - Harry H. Cheng, 2010. C for Engineers and Scientists: An Interpretive Approach, McGraw Hill



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Consider the simple pendulum problem. The rod of which the bob mass swings has the length $l = 0.15 \text{ m}$ and swings from an initial angle $\theta_0 = 1.5 \text{ rad}$. Construct a C program using *ChIDE software* to determine the location of the bob mass, θ . The equation for a simple pendulum is given by:

$$\theta = \theta_0 \cos\left(\sqrt{\frac{g}{l}} t\right)$$



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a) Write a function that plots the change in θ vs t ;

```
void plotsinwave(double t[], double  
                theta[])
```

which takes in 2 arguments $t[]$ and $theta[]$ of type double array where $t[]$ is a range of time $initialT \leq t \leq finalT$ with 100 points in between and $theta[]$ is the values for the equation above for the range of t .

The user is prompted to input variables $initialT$ and $finalT$ via the terminal screen.



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- b) Present the output as in **Table 1** format below. Your answers must be in **four decimal places**.

Table 1

t (s)		theta (rad)
???		???
???		???
???		???

- c) Plot the output using the predefined function in ChiDE: `plotxy()`

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- In your code, make sure you:
 - Use appropriate comments
 - write your name, student ID and a brief explanation of what your code does
 - comment on certain important lines
 - Program structure
 - Include all important elements (stdio.h, int main(), return 0 etc)
 - Declaration of variables
 - Assign appropriate types to the variables
 - Assign appropriate names for the assigned variables
 - Assign appropriate values to the variables



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