

CS 0411 assignment 1

Due on January 22, 2010

Each student is required to do this assignment **individually**. Type all of your answers in an electronic file (you can use plain text or Microsoft Word), which includes your explanation and data of inputs and output. All computer programs should be saved in separated files. Send your answer sheet and program files to the course email account:

`cs0411@peace.lakeheadu.ca`

In the email, you should indicate your name, student ID, assignment number and a list of attachments. All the program files should be sent as attachments of the email.

Assignments which do not meet above requirement risk reduced marks or even no marks.

The grade of the assignment will depend on:

Documentation and readability: 20 %

Correctness: 80 %

Problem 1.

The current in an alternating current circuit that contains resistance, capacitance, and inductance in series is given by

$$I = \frac{E}{\sqrt{R^2 + (2\pi fL - 1/(2\pi fC))^2}}$$

where I = current (amperes), E = voltage (volts), R = resistance (ohms), L = inductance (henrys), C = capacitance (farads) and f = frequency (hertz). The following program tried to calculate the current by reading values for the E , R , C , and f . However, there are errors in the Fortran program.

Your work is to correct the errors first, then compile the program and run it several times. You also need to add necessary comments to the source codes. On your answer sheet, list the changes you made and record the input and output.

Program Current

```
real:: E,R,C,f
real, parameter::pi=3.1416,L=.35
print* "input the values of E,R,C,f:"
read* E,R,C,f
I = E/sqrt(R*R+(2pi*f*L-1/(2pi*fC)**2)
print* "When E=",E, " R=",R,"C=",C,"and f=",f
```

```
print* "the value of current I =",I  
end Program
```

Problem 2.

The period of a pendulum is given by the formula

$$P = 2\pi\sqrt{\frac{L}{g}} \left(1 + \frac{1}{4} \sin^2 \left(\frac{\alpha}{2} \right) \right)$$

where $g = 980 \text{ cm/sec}^2$, $L =$ pendulum length (cm), $\alpha =$ angle of displacement.

Write a program to read values for L and α and then calculate and display the period of a pendulum having this length and angle of displacement. Run your program with the following input.

L	α
120	15
90	20
60	5
74.6	10
83.6	12

Print out your source file and out put in your answer sheet.