City of Bristol College *Faculty of Engineering, Aeronautical & Transport*
University of Plymouth Colleges

MODULE ASSESSMENT **RECORD SHEET**

NAME OF STUDENT:	CLASS**:** **2009/2010**
COURSE: **FOUNDATION DEGREE IN ENGINEERING (EMBEDDED HNC)**	

MODULE TITLE: **INTRODUCTION TO PROGRAMMING & DESIGN**	MODULE NUMBER: **ENGB 108**

ASSESSMENT TITLE: **Coding Of C Programme– Series Tuned Circuit response**	NUMBER**:** **1**	WEIGHTING: **10%**
LEARNING OUTCOMES *ASSESSED***:** (*Refer to Module Syllabus):* **1 /2 / 3 / 4**		
DATE ISSUED: 17th December 2009	DATE TO BE RETURNED**:** **4th February 2010**	

I confirm that the work is the result of my own efforts. Where I have included references from the work of others as part of this assessment, I confirm that I have acknowledged the author of that work in the report, with the date of publication and have included full details in my bibliography which has been produced using the Harvard convention.

Signed .....Date.....

TASK	1	2	3	4	5	6	7	8	9	10
MARK										
								TOTAL MARK :		

LECTURER'S COMMENTS / ACTION FOR STUDENT:

ORIGINATOR**:** **Ian Shere**	SECOND READER: **Don Davidson**
Date handed in and initials of recipient if other than originator:	

Faculty Of Engineering, Aeronautical & Transport

Foundation Degree In Engineering (Embedded HNC)

INTRODUCTION TO PROGRAMMING & DESIGN

Assignment No. 1

AIM:

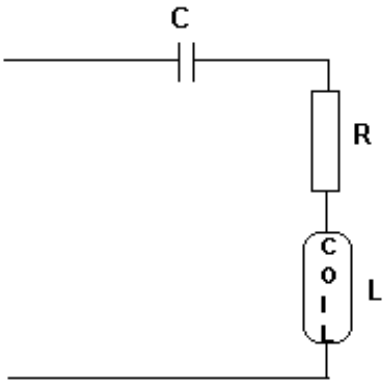
To produce a **modular structured C programme**, complete with documentation, to complete the detailed task.

SCENARIO:

Your training officer has had a request from the hardware designers for software which would enable them to produce response charts for a serial tuned circuit. As an Electronics Engineer who is learning C as part of a training programme, you have been tasked with the responsibility of producing the required software. In the task, you are to act as a program coder to implement a given analysis and design in C programme.

SPECIFICATION:

The software is to calculate the capacitive reactance (**Xc**), inductive reactance (**Xl**) and impedance (**Z**) for the following circuit for a range of frequencies within a frequency band (7 frequencies equally spaced around the resonant frequency).



The information is to be displayed on the screen in a suitable table.

The values of the circuit components R, L and C are to be obtained from the user via the keyboard. The values of resonant frequency (**fo**), the Q factor at resonance (**Qo**) and the bandwidth are also to be output.

The software is to continually run until the operator decides to quit

NOTE : Assume that all operator inputs are of the correct data type and of practical value.

ANALYSIS:

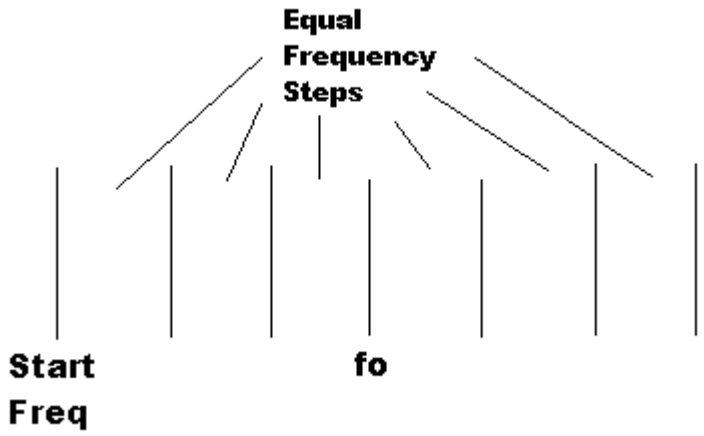
a) **Inputs**

Input	Data Type	Unit
Resistor value	Real	ohms
Inductance value	Real	mH
Capacitance value	Real	uF

b) **Outputs**

Output	Data Type (if applicable)	Unit
Resonant Frequency (fo)	Real	Hz
Bandwidth	Real	Hz
Q factor (Qo)	Real	
Response Table (7 times)		
Frequency (f)	Real	Hz
Inductive Reactance (Xl)	Real	ohms
Capacitive Reactance (Xc)	Real	ohms
Impedance (Z)	Real	ohms
Table Header Data		
Operator Prompts for input of component values		

c) Frequency Range



Freq Step = fo / Number Of Steps

Start Freq = fo – ((Number of Steps – 1) / 2) x Freq Step

d) Output Table

OUTPUT TABLE
****

Freq (Hz)	Xl (ohms)	Xc (ohms)	Z (ohms)
xxxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxx

Resonant Frequency (Hz) - xxxx
Q Factor - xxxx
Bandwidth (Hz) - xxxx

DESIGN:

See Appendix A

REQUIREMENTS:

You are to:

a) Implement the given analysis and design in a modular structured C programme to the City of Bristol College documentation standard.
b) Produce a software document to contain:
    i) The specification
    ii) Analysis documentation
    iii) Design documentation
    v) Fully commented application listing.

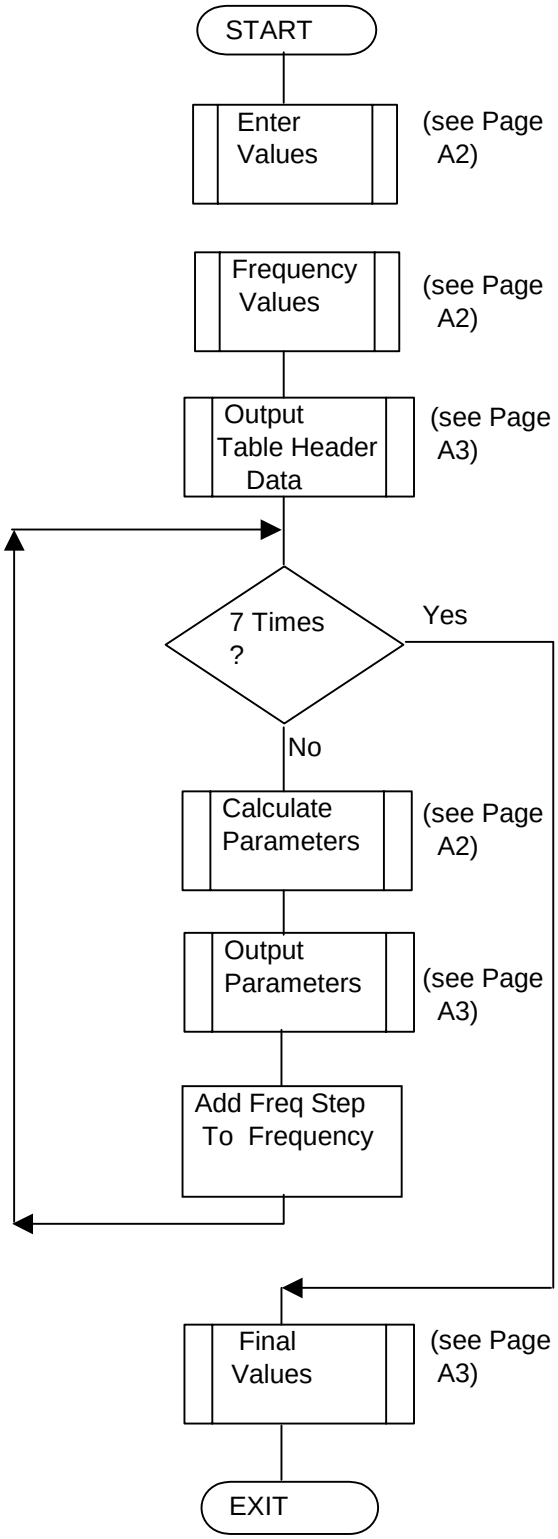
MARKING SCHEME:

REQUIREMENT	EVIDENCE	%
a	Working modular structured C programme that matches the design	65
	Program style & method Commenting Layout	 15 10
b	Software document	10
	TOTAL	**100**

WEIGHTING:

This assignment carries a weighted mark of **10%.**

APPENDIX A



MAIN LEVEL FLOWCHART

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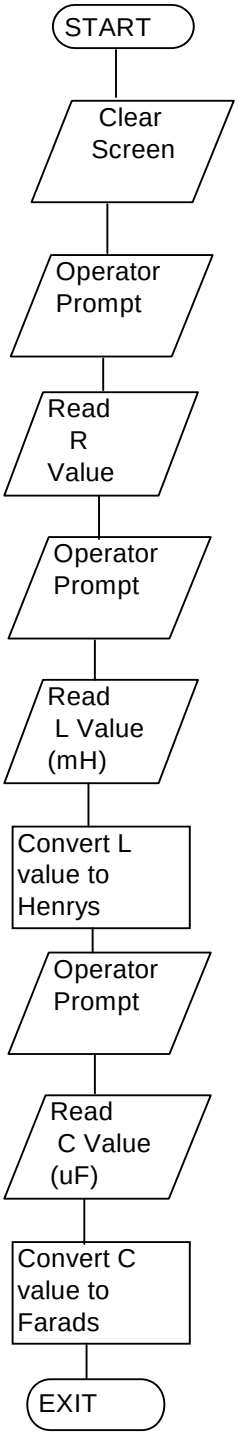
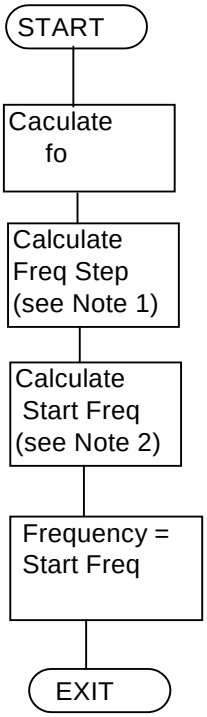


ENTER VALUES FLOWCHART

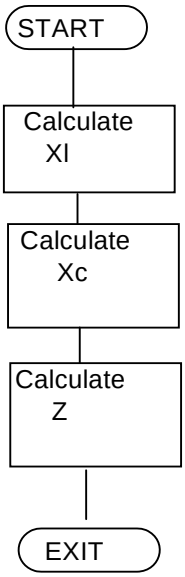


Notes 1 - Freq Step = fo / Number Of Steps

2 - Start Freq =

fo - (((Num Of Steps) - 1) / 2) x Freq Step

FREQUENCY VALUES FLOWCHART



CALCULATE PARAMETERS FLOWCHART

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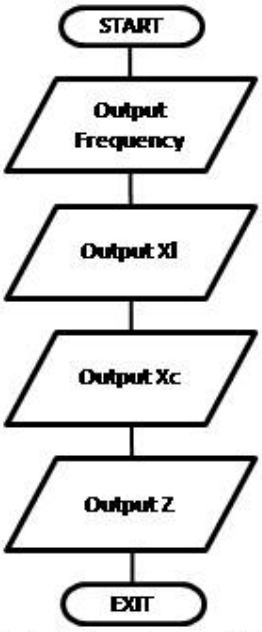
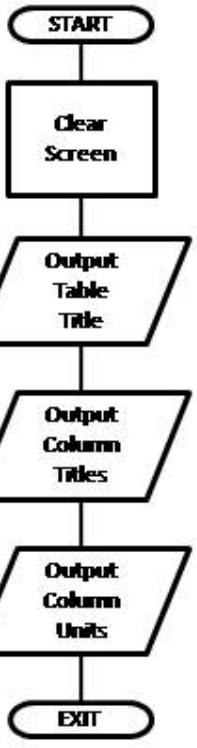
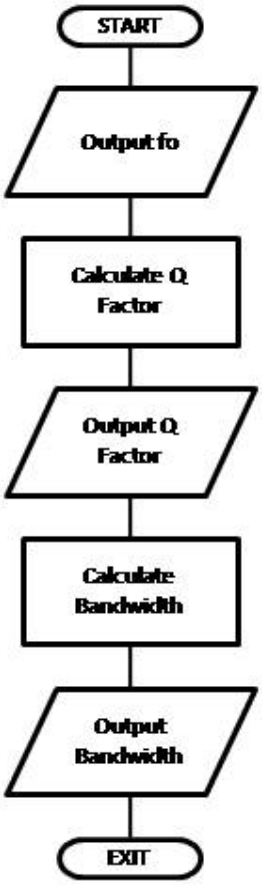


Note: All outputs to next row of table

OUTPUT PARAMETERS FLOWCHART



OUTPUT TABLE HEADER DATA FLOWCHART



Note: All outputs with suitable messages

FINAL VALUES FLOWCHART

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