

Computing (International Year 1)

Coursework Brief

Module Title:	Computing	IY1
Title of Coursework:	A Simple Electric Circuit Programme	
Hand-out date:	18 th May 2020	
Hand-in date:	14 th June 2020	
Weighting within the module	75% of total module mark	
Word limit / presentation criteria	Project deliverables include texts, diagrams and codes	
Learning Outcomes to be assessed (from module spec.)	<p>K1. Understand procedural and object-oriented programming approaches and be able to apply them in real-world problem-solving</p> <p>K2. Apply and implement required operations of related procedural and object oriented languages such as C and C++</p> <p>K3. Outline and define how to plan software using modelling techniques, test software using debug techniques and document software using comments</p> <p>A1. Create a well-written and well documented computer programme from a detailed design specification</p> <p>A2. Employ a recognised software development method to design and implement software which meets a specified requirement</p> <p>A3. Communicate the results of their study accurately and reliably and with structured and coherent arguments</p>	

Coursework Details

Drawing Shapes

You are asked to develop a program to calculate the area of 4 shapes that inherit from a shape class. In order to complete this coursework, you will need to use almost all knowledge we learned in this module, including flow chat diagram, pre-processor, I/O statements, operators, control statements (decision-making & loop), class, function, sequential files, in-code comments etc.

The shapes may optionally make calls to a Math class or use inbuilt math library calls which has a square function and a PI constant = 3.142.

Methods which are polymorphically overloaded includes

1. Area method: This will calculate the area of the shape
2. Draw method: This will draw the shape unto the screen using the following mechanism.

It will draw based on the number of stars (Asterix) that can be drawn on the screen.

The second task is to allow the user to perform the following operations:

1) Set basic shape properties

For the rectangle will be the base length, for the rectangle the length and the base, for the square, the length of the side and for the circle the radius.

2) Change shape properties

Any of the properties for any of the shapes can be changed and the new area and drawing will be accurately calculated.

3) Maintain a list of shapes

The user should be able to select the number of shapes to display the type of shape and the properties of each shape.

4) Display Shapes and areas

User should be able to see the visual representation of the shapes in the list of shapes. All shapes should be appropriately sized based on values calculated from their properties.

5) Exit

When a user selects this option (i.e. input 5), this indicates that s/he would like to exit the system.

NOTE:

- The system should continue to display the five options (i.e. main menu) after completing an operation, until the user selects 'Exit' option.
- Extra marks will be given to add new shapes other than square triangle, rectangle and circle.

- Sample output of the program is attached at the end of this document.

Submission

You need to submit both **printed copy** (to Rosy in Admin Office) and **electronic copy** of your project (via the assignment submission area in Unilearn).

For electronic copy, you should submit your work in *.doc* or *.pdf* format. Please name this using the convention ***YourInitial_YourSurname_Cpp_Coursework.doc*** (or *.pdf*) (so that if your name is Steve Jobs you would name it as *S_Jobs_Cpp_Coursework*). If your work cannot be submitted as a single document then you should submit a single zip file containing all your documents, as Unilearn will only allow a single submission for each student. Please make sure that you check your work carefully following submission.

Your solution must be original. Please make sure that you are familiar with the regulations regarding plagiarism and late submissions procedure.

Marking Criteria

There are 3 criteria for this assignment. Weight of each session is indicated on the right-hand side.

- **Planning:** This includes any diagrams or documents that you have produces to plan and understand your system. You may have employed flow chart diagrams for each activity/function of your system, produced a storyboard of the sequence of activities or something less formal. In order to produce a solution to this problem you are strongly encouraged to apply techniques of analysis in order to break the problem down into manageable and solvable elements. **[30%]**
- **Functionality:** This criterion focuses on the extent to which your project achieves what it is required to do, and the way by which it goes about doing it. Class must be used to model the resistor and all the four basic functions which are described in the brief must be included as functions. You are likely to receive extra marks if you illustrate your creativity and extend the system capabilities defined by the project brief. **[40%]**
- **Documentation:** This criterion considers the degree to which your assignment gives the impression of a coherent, thoughtful, thorough and sustainable project. Consistency throughout the project in terms of your visual approach, your use of terms and the linkage between the statement of goals in your planning and their final realisation. This also includes in-code commenting and use of a consistent and readable coding style. **[30%]**

Sample Program Output

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