



Prifysgol Cymru
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COURSE: games

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 4

LEFEL 4

EXAMINATION PERIOD
MAY 2019

CYFNOD ARHOLIADAU
MAI 2019

MODULE CODE: ACCA4016
ACADEMIC AND EMPLOYABILITY SKILLS
(COMPUTATIONAL THINKING)

TIME: 2 HOURS

NOTE: IN-CLASS TEST, WED 15th MAY 2019 PM

Equipment or materials required – Computers with Visual Studio installed

Adnoddau neu ddefnyddiau sydd eu hangen – Cyfrifiraduron gyda Visual Studio

This is an open-book test, you may consult notes and/or Moodle.

ANSWER ALL QUESTIONS

8
39
6-5
53.5

1. [20 marks total:]

No code is required to answer this question.

A software developer is asked to write a program to calculate the tax paid on a number of products that have been purchased throughout the year. To use the application, the user must enter a valid username and password within three attempts. If they fail to correctly login after 3 attempts, they must be prevented from logging in again for 5 minutes.

Constraint 1: The correct username and password can be defined in the code itself, there is no need to enter or provide this information.

Constraint 2: The user must initially enter the total number of products for which they are going to enter values.

Based on this scenario, answer the following questions:

- A. A programmer has created a function named *InputCostsProcessAndOutputResult*. Give reasons why this function name is a poor choice and why it suggests the programmer has not given sufficient attention to the structure of the code.

[4 marks]

The function name is too long and overlaps what other functions maybe processing.

✓2

- B. Provide a list of the problems that must be solved to implement the code for this application and place them in the order that you would attempt to solve them. Avoid vague statements that may involve solving multiple problems. However, the problems identified may be posed in the form of questions e.g. "How do I choose a colour?".

display user to enter login details ~~and then~~ to
ask a count and to store the information in
a string to do the same with password ✓
Then set password and user name to a variable
to place the enter login details in to a for
loop to allow to loop 3 times ✓ only the
to put the login and password in to a if
So if login and password are correct leave
loop if not loop 3 times the display ✓
incorrect login must ~~wait~~ wait 5 minutes.

3

[8 marks]

- C. Describe the tests you would use to confirm the program is running correctly.

[8 marks]

First Test enter correct login and correct password ✓
Second test enter correct login and incorrect password ✓
Third test enter incorrect login and correct password ✓
Fourth test enter incorrect login and incorrect password. 3

2. [50 marks total:]

Using appropriate functions implement an application which displays a text-based menu listing that allows the user to select between calculating the area of a rectangle, calculating the area of a circle and exiting. For example, the menu might display "1. Calculate area of rectangle" and the user must enter the number one to select this option. If they choose not to exit then the menu should be redisplayed and they should be allowed to select another option. When calculating the area of the rectangle they must be prompted to enter the width and the height of the rectangle, but when calculating the area of a circle they should be prompted to enter the radius. In both cases, the result should be displayed once it has been calculated.

The program may look like this:

```
1. Calculate area of rectangle
2. Calculate area of circle
3. Exit
```

```
Choose option: 1      ← Text shown in RED is entered by user
Please enter width: 2
Please enter height: 3
Area of rectangle is 6
```

```
Choose option: 3
Program is exiting
```

- A. Provide a list of the problems that must be solved to implement the code for this application and place them in the order that you would attempt to solve them. Avoid vague statements that may involve solving multiple problems. However, the problems identified may be posed in the form of questions e.g. "How do I choose a colour?".

[20 marks]

First to take out the options using a cout to display "1. calculate area ..." and then a set up a switch statement to get the input a number set as a int and to go into ~~option~~ option then to set up a switch statement to be none option 1 to be calculate area of a ~~rectangle~~ ^{rectangle} to be calculate area of circle and 3 to be Exit and defect to be incorporate like 1, on the switch enter out using for the width and height a getline to take number stores as int and x the to do a second code use cout to get the Height and such in y the calculate the total of display use cout. (more space to write overleaf)

to be a float.

to ~~take~~ place the same in Switch(option) 2,
 ask the user to enter the Radius using a cout ~~get~~ and
 a getLine to take the the number stored under R
 the calculate the R at $PI \times 142$ at display ~~1/2~~ total
 as a float. to place the next display option
 as getting to options in to a ~~for~~ while ~~eq~~
 and to leave loop when user enters 3, exit.

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B. Write the code (in Visual Studio) for the functions required to solve the problems previously identified.

Hint 1: Develop the code in stages, marks will be awarded for any working code that contributes to the solution.

Hint 2: Area of rectangle = width x height

Hint 3: Area of circle = $PI \times \text{radius}^2$ ← Ask if you don't understand "squared"

[30 marks]

3. [30 marks total:]

A program must determine if a point (x, y) is contained within a square. To define the square, the user must first enter the top left position (x_L, y_T) and the width of the square. Having entered this information, they may then enter the position of the point and the program should display either "Point is contained in the square" or "Point is outside of the square".

A.

Explain the steps and the logic required to solve this problem.

Hint: What is the left, right, top and bottom of the square?

Note 1:

You may include diagrams in your explanation.

Note 2:

Marks will be awarded for simplifying this problem if you are unable to solve it.

Attacking a problem from a different angle is perfectly acceptable provided you can provide reasonable arguments to justify your approach i.e. you are attempting to learn something new about the original problem.

[20 marks]

First have the user enter top left position
user (x_L, y_T) display the question to enter top left
position user a cout getting to input the numbers
entered to an 2d array $[x, y]$ avoid to able
the user for the width and store it as a int
as squares are the same size all around we
don't need to work out much the Height and width
are equal

	x	y
0	x_L	y_T
1	x_L	y_T

6

B.
Implement the code (in Visual Studio) for your solution.

[10 marks]

Diwedd/End

