



Prifysgol Cymru
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Trinity Saint David

LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 4

LEFEL 4

EXAMINATION PERIOD
MAY 2019

CYFNOD ARHOLIADAU
MAI 2019

MODULE CODE: ACCA4017
SOFTWARE DEVELOPMENT

TIME: 2 HOURS

ANSWER ALL QUESTIONS

NOTE: IN-CLASS TEST, TIME/DATE TO BE ARRANGED BY LECTURER

Equipment or materials required – Computers with Visual Studio installed

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REMEMBER:

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ANSWER ALL QUESTIONS

1. a) Which variable type would be most suitable to store each of the following values?

3.142*float, or double or single*.....

123*int*.....

Jim*string or char[] (not char)*.....

79.6*float, or double or single*.....

a*char*.....

-34.52*float, or double or single*.....

[1 mark each - 6 marks total]

1 b) What errors are present in the following program to calculate the area of a triangle?

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace ExamQ1b
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Area of Triangle");
            Console.Read("Enter base length");
            // Console.Write("Enter base length"); - method should be Write, not Read

            double b = double.Parse(Console.ReadLine);
            // double b = double.Parse(Console.ReadLine()); - missing () for ReadLine
            method Console.Write("Enter base height");
        }
    }
}
```

```

        double h = double.Parse(Console.ReadLine())
//        double h = double.Parse(Console.ReadLine()); - missing : at end of line

        area = b * h * 0.5;
//        double area = b * h * 0.5; - data type of double missing

        Console.WriteLine("Area of triangle is {0}.", area.ToString("0.00"));
//        Console.WriteLine("Area of triangle is {0}.", area.ToString("0.00")); -
missing 0 in place holder

        Console.ReadLine(); //pause
    }
}

```

[5 marks]

1 c) How many iterations do the following loops have?

i) for (int index=0; index<12; index++)
 {
 Console.WriteLine(index);
 }

.....12.....

ii) int index=1;
 while(index<6)
 {
 Console.WriteLine(index);
 index = index + 1;
 }

.....5.....

[4 marks]

[4 marks – 2 marks each]

1. d) What is the value of the integer variable total after the following code is executed?

```

total=1;
for (x=0; x<7; x++)
{
total=total+x;
    if(x==4)
    {
        total=0;
    }
}

```

.....11.....

[3 marks]

1 e) Given the following program:

```

void main()
{
    int x = 3;
    if( x .... )
    {
        Console.WriteLine("x does not exceed 3");
    }
    .....(x....)
    {
        Console.WriteLine("x exceeds 5" );
    }
    else
    {
        Console.WriteLine ("x is " + x );
    }
}

```

i) Write the code you would use to test x in the first condition:

.....*x <= 3*..... [1 mark]

ii) Write the code you would use to test x in the second condition:

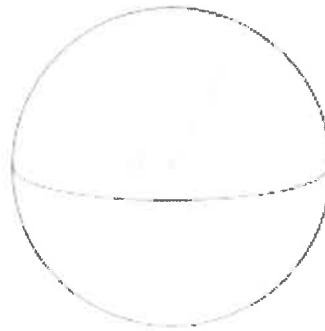
.....*else if(x > 5)*..... [1 mark]

[20 marks total for Question 1]

2. Calculating the surface area of a sphere

The surface area of a sphere is calculated using the formula:

$$A = 4 \pi r^2$$



Task:

Write a program to calculate the area using the above formula displaying the answer in a suitable message and showing value to 2 decimal places.

Allow the user to enter the measurement for r . You may set PI as 3.142

[10 marks total for Question 2]

Solution

Students should present efficient code to accomplish the task. A possible solution is shown below.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace Exam2018_19Sphere
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Calculating the surface area of a sphere");
            Console.Write("Please enter the radius:");
            double rad = double.Parse(Console.ReadLine()); // data type of int loses
marks          double area = 4 * Math.PI * rad*rad; //
            Console.WriteLine("The surface area of a sphere of radius {0} is {1}.",
rad, area.ToString("0.00"));

            Console.ReadLine();//Pause
        }
    }
}
```

Required:

Correct use of constants or use of Math.PI [1]

Choice of appropriate types and suitable choice of variable names [3]

Formula correct, calculation made and printed out [4]

Use of formatting to 2dp and "user friendly" printed message [2]

3. Using arrays

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Task:

Prompt the user to enter 5 temperatures into an array (in Celsius).

After the temperatures have been entered, print each of the values on the screen using a loop.

After this, convert the five temperatures to Fahrenheit and print them on the screen to 2 decimal places.

*Formula: Fahrenheit=(Celsius * 9/5) +32*

[15 marks total for Question 3]

Solution

Students should present efficient code to accomplish the task. A possible solution is shown below.

```
#include <stdio.h>
```

```
void main()
{
float temps[5];
float fahrenheit;
int i;

    for (i=0;i<5;i++)
    {
        cout << "Please enter next value in centigrade";
        getline ...etc
        stream >> temps[i];
    }
    printf ("The temperatures were:");

    for (i=0;i<5;i++)
    {
        cout << temps[i];
    }

    cout << "The temperature in Fahrenheit are:" << endl;
    for (i=0;i<5;i++)
    {
        fahrenheit=(temps[i]*(9/5f)+32);
        cout << Fahrenheit << endl;
    }
}
```

Required:

Sensible use of loops [3]

Use of array with float value [5]

Use of %.2f to two decimal places [2]

Conversion to Fahrenheit [5]

4. Using Array Search Pattern

Write an appropriate structure to hold 4 pieces of data about a city (eg name, population size in millions, country, number of parks, etc)

Store the data for three cities using this structure and print the data for each on the screen.

[15 marks total for Question 4]

Solution

Students should present efficient code to accomplish the task. A possible solution is shown below.

```
void main()
{
string names[8];
string searchName;
int i;
bool found = false;

    for (i=0;i<8;i++)
    {
        cout << "Please enter next name";
        getline(cin, names[i]);
    }
    printf ("The enter search name:");
    getline(cin, searchName);

    for (i=0;i<8;i++)
    {
        if(names[i] == searchName)
        {
            found = true;
            break;
        }
    }

    if(found)
    {
        cout << "Found It";
    }
    else
    {
        cout << "Failed to find it";
    }
}
```

Student should declare a suitable structure and enter data into objects as required. This could be done with individual objects, or via an array.

Appropriate types [3]

Appropriate lengths for arrays [2]

Use of search [5]

Only one message displayed [3]

Overall code structure [2]

Diwedd/End

