



Prifysgol Cymru
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Trinity Saint David

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LOCATION: SWANSEA

LLEOLIAD: ABERTAWE

LEVEL 4

LEFEL 4

EXAMINATION PERIOD
MAY 2022

CYFNOD ARHOLIADAU
MAI 2022

MODULE CODE: ACCB4017
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 code editor installed

Adnoddau neu ddefnyddiau sydd eu hangen – Cyfrifiraduron gyda code editor

ANSWER ALL QUESTIONS

NOTE: Student will answer the questions below using the programming language they have studied during the module. The questions/solutions shown below refer to the Python language, but some groups may be studying the module using other programming languages (such as C). Therefore the paper will be adapted to reflect this if required.

Additionally, where delivered online (eg via Moodle) questions may be drawn from a random pool, but will be in the style and of a similar difficulty level to those listed below.

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

g	Char
2112	integer
Sarah	String
3.21	double
H2	String
-34.62	double

[1 mark each - 6 marks total]

1 b)

What errors are present in the following code for welcoming a user to a program? Line numbers are included for easy reference

```
static void Main(string[] args)
```

```
{
```

```
    Console.WriteLine("Welcome to my program");
```

```
    Console.Write("Input your name");
```

```
    int myName = Console.ReadLine();
```

Should be

String

```
    Console.WriteLine("Hello {0} Nice to meet you" myName);
```

```
    Console.WriteLine("I shall greet you 11 times!");
```

```
    for (int i = 0; i < 10; i++)
```

```
    {
```

```
        Console.WriteLine("Greetings!!")
```

```
    }
```

```
}
```

no closing quote quotation marks

no comma or "+"

no semi colon

[5 marks]

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

```
for (int i = 1; i < 8; i++)  
{  
    Console.WriteLine("Hello");  
}
```

8

```
int x = 3;  
while (x < 14)  
{  
    Console.WriteLine("Hello");  
    x = x * 2;  
}
```

2

3 = 6
6 = 12

[4 marks – 2 marks each]

0

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

```
int total = 0;  
for (int i = 0; i < 8; i++)  
{  
    total = total + x;  
    if (x == 5)  
    {  
        total = 0;  
    }  
}
```

.....

[3 marks]

1 e) Logic

i) Given the following values $x=5$, $y=3$, $z=12$ is the statement below true or false?

$x==y$

..F...

ii) Given the following values $x=5$, $y=3$, $z=12$ is the statement below true or false?

$x < z/y$

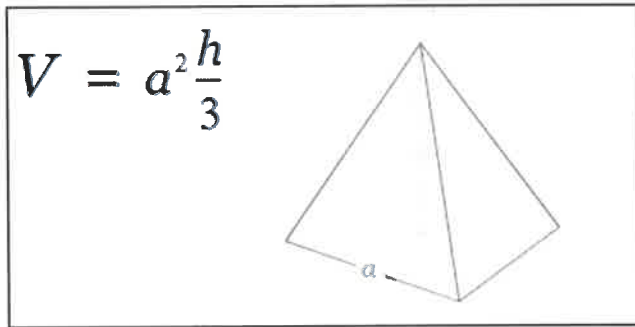
..F...

[2 marks total]

[20 marks total for Question 1]

2. Calculating the volume of a square-based pyramid

The volume of a square-based pyramid is calculated using the formula shown below:



Task:

Write a program to calculate the volume of the pyramid using the above formula.

Allow the user to enter the measurements for a and h . Both a and h should be positive numbers.

Print the volume on the screen to 2 decimal places

[10 marks total for Question 2]

3. Using lists or arrays

Task:

Write a program designed to calculate the average age of some people in a room. There are 6 people in the room. Start by declaring an empty array eg

```
int[] ages = new int[6];
```

1. Prompt the user to enter the six ages (these should be within normal human lifespan!).
2. After the ages have been entered, print each of them on the screen.
3. Calculate the average age of the people in the room (to 2 decimal places) and print it on the screen.

Use loops where appropriate

Sample output:

```
Enter next age: 35
Enter next age: 42
Enter next age: 234
Sorry out of range. Try again: 23
Enter next age: 56
Enter next age: 18
Enter next age: 52
Here are the ages you entered:
35.0  42.0  23.0  56.0  18.0  52.0
The average age is: 37.67
```

[15 marks total for Question 3]

4. Using Methods

Task:

Write a method called *EnterName()* to allow the user to enter the name of a conference delegate and return it as a string variable.

The method should be called 3 times, once for each of 3 conference delegates, and the (local scope) name entered returned to the main program and stored in an list or array.

Print the names entered from the main program, then calculate the total bill for attending the conference (£65 per person) and print it on the screen

Sample output:

```
Enter name of next delegate:
Gaynor Thomas
Enter name of next delegate:
Beverley Holland
Enter name of next delegate:
James Williams

The delegates who attended today were:
Gaynor Thomas  Beverley Holland  James Williams
Total due is £ 195
```

[15 marks total for Question 4]

Diwedd/End

```

1  using System;
2  using System.Collections.Generic;
3  using System.Linq;
4  using System.Text;
5  using System.Threading.Tasks;
6
7  namespace SoftDevExQ2
8  {
9      class Program
10     {
11         static void Main(string[] args)
12         {
13             // SEAN GARRINGTON SOFTWARE DEV EXAM Q2 -- SQUARE BASED PYRAMID
14
15             double height = 0;
16             double area = 0;
17             bool check1 = false;
18             bool check2 = false;
19
20             while (check1 == false)
21             {
22                 Console.WriteLine("Enter a positive value for height");
23                 double.TryParse(Console.ReadLine(), out height);
24                 IsPos(height, out bool result);
25                 if (result == false)
26                 {
27                     Console.WriteLine("Please try again");
28                 }
29                 else
30                 {
31                     check1 = true;
32                 }
33             }
34
35             while (check2 == false)
36             {
37                 Console.WriteLine("Enter a positive value for area");
38                 double.TryParse(Console.ReadLine(), out area);
39                 IsPos2(area, out bool resultA);
40                 if (resultA == false)
41                 {
42                     Console.WriteLine("Please try again");
43                 }
44                 else
45                 {
46                     check2 = true;
47                 }
48             }
49
50             Calc(height, area, out double v);
51             Console.WriteLine("The volume is " + Math.Round(v, 2) + "cm^3");
52             Console.ReadLine();
53
54         }
55         public static bool IsPos(double test, out bool result)
56         {
57             if (test < -1 || test == -1)
58             {
59                 return result = false;
60             }
61
62             else return result = true;
63         }
64
65         public static bool IsPos2(double test, out bool resultA)
66         {
67             if (test < -1 || test == -1)
68             {
69                 return resultA = false;
70             }
71

```

2 + 4 + 4 = 10

```
72         else return resultA = true;
73     }
74
75     public static double Calc(double h, double a, out double v)
76     {
77         v = (a * a) * (h / 3);
78
79         return v;
80     }
81 }
82
83
```

```

1  using System;
2
3  namespace SoftDevExQ3
4  {
5      class Program
6      {
7          static void Main(string[] args)
8          {
9              // SEAN GARRINGTON SOFTWARE DEV Q3
10
11              double[] ages = new double[6];
12              bool check = false;
13
14              for (int i = 0; i < ages.Length; i++)
15              {
16                  check = false;
17                  while (check == false)
18                  {
19                      Console.WriteLine("Please enter an age");
20                      double.TryParse(Console.ReadLine(), out ages[i]);
21                      OfAge(ages[i], out bool result);
22                      if (result == false)
23                      {
24                          Console.WriteLine("Invalid age, try again");
25                      }
26                      else
27                      {
28                          check = true;
29                      }
30                  }
31              }
32
33              Console.WriteLine("Here are the ages you entered");
34
35              for (int i = 0; i < ages.Length; i++)
36              {
37                  if (i == 5)
38                  {
39                      Console.Write(Math.Round(ages[i], 0) + ".");
40                  }
41                  else
42                  {
43                      Console.Write(ages[i] + ", ");
44                  }
45              }
46
47              // Avg Age
48
49
50              AvgAge(ages, out double avg);
51              Console.WriteLine("\n" + "The average age is: " + Math.Round(avg, 2));
52
53          }
54
55          public static bool OfAge(double a, out bool result)
56          {
57              if (a > 100 || a < 0)
58              {
59                  return result = false;
60              }
61              else
62              {
63                  return result = true;
64              }
65          }
66
67          public static double AvgAge(double[] a, out double avg)
68          {
69              double calc = 0;
70              for (int i = 0; i < a.Length; i++)
71              {

```

5+5+3+2
15

```
72         calc = calc + a[i];
73     }
74
75     avg = calc / a.Length;
76     return avg;
77
78 }
79
80 }
81
```

```

1  using System;
2
3  namespace SoftDevExQ33
4  {
5      class Program
6      {
7          static void Main(string[] args)
8          {
9
10             // SEAN GARRINGTON Q4
11
12             for (int i = 0; i < 2; i++)
13             {
14                 Console.WriteLine("Please enter delegate name");
15                 EnterName(Console.ReadLine(), out string[] dele);
16             }
17             Console.WriteLine("The delegates who attended today were: " dele[0]
18             + ", " + dele[1] ", ");
19         }
20
21         public static string EnterName(string name, out string[] dele)
22         {
23             string[] temp = new string[3];
24
25             for (int i = 0; i < temp.Length; i++)
26             {
27                 name = temp[i];
28             }
29
30             return dele[];
31         }
32     }
33 }
34

```

2 + 2 + 3 + 2 + 1

10

