Answers to Chapter 11 questions

Activity 11.1

It is easy to see what all three small programs should do but the Scratch program shows how you would run the program. Scratch is designed as an introduction to programming.

Activity 11.2

Python

```
print ("Hello Computer Scientists")
```

JavaScript

```
<HTML>
<HEAD>
<TITLE> Hello World
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
document.write ('Hello Computer Scientists')
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>
```

Activity 11.3

The height and the radius should be variables, π should be a constant.

Python

```
Height = float(17.3)
Radius = float(4.5)
ConstPi = float(3.142)
```

JavaScript

```
const ConstPi = 3.142;
var Height,Radius;
```

Activity 11.4

Python

```
YourName = "Helen"
print ("Hello ",YourName)
```

JavaScript

```
<HTML>
<HEAD>
<TITLE> Hello Me
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
var YourName = 'Helen';
document.write ('Hello ',YourName)
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>
```

Activity 11.5

a Python

```
Name = "David"
Address = "Binary Way"
Gender = "M"
Over18 = True
HairColour = "Red"
ShoeSize = int(9)
WeightKg = float(80.1)
ConstMale = "M"
ConstFemale = "F"
```

JavaScript

```
var Name = 'David ';
var Address = 'Binary Way';
var Gender = 'M';
var Over18 = true;
var HairColour = 'Red';
var ShoeSize = 9;
var WeightKg = 80.1;
const ConstMale = 'M';
const Constfemale = 'F';
```

b Python

```
Name = "David"
Address = "Binary Way"
Gender = "M"
Over18 = True
HairColour = "Red"
ShoeSize = int(9)
WeightKg = float(80.1)
ConstMale = "M"
ConstFemale = "F"
print ("Name ", Name)
print ("Address ", Address)
print ("Gender ", Gender)
print ("Over18 ", Over18)
print ("Hair colour ", HairColour)
print ("Shoe size ", ShoeSize)
print ("Weight in Kilograms ", WeightKg)
print ("Constants ", ConstMale, ConstFemale)
```

JavaScript

```
<HTML>
<HEAD>
<TITLE> Personal Information
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
var Name = 'David ';
var Address = 'Binary Way';
var Gender = 'M';
var Over18 = true;
var HairColour = 'Red';
var ShoeSize = 9;
var WeightKg = 80.1;
const ConstMale = 'M';
const ConstFemale = 'F';
document.write ('Name ',Name, '<br>');
document.write ('Address ',Address, '<br>');
document.write ('Gender ',Gender,'<br>');
document.write ('Over 18 ',Over18,'<br>');
document.write ('Hair colour ',HairColour,'<br>' );
document.write ('Shoe size ',ShoeSize,'<br>');
document.write ('Weight in Kilograms ',WeightKg,'<br>');
document.write ('Constants ',ConstMale,ConstFemale);
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>
```

c Test data ideas:
Bill, Kilobyte Road, M, True, Brown, 11, 80
Tessa, Byte Place, F, False, Red, 4, 60
Albert, Astana, W, XX, 45.9, –11, –123 (How should you change your program to trap these errors?)

Activity 11.6

Python – no case statement
JavaScript – Switch statement

Activity 11.7

Python

```
NumberOfTickets = int(0)
Discount = float(0)
Cost = float(0)
while NumberOfTickets < 1 or NumberOfTickets > 25:
            NumberOfTickets = float(input ('How many tickets would
you like to buy? '))
Discount = 0.2
if NumberOfTickets < 10:
            Discount = 0
elif NumberOfTickets < 20:
            Discount = 0.1
Cost = NumberOfTickets * 20 * (1 - Discount)
print ('Your tickets cost', Cost)
```

JavaScript

```
<HTML>
<HEAD>
<TITLE> Example 1
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
var NumberOfTickets = 0;
var Discount = 0.0;
var Cost = 0.0;
do
        {
         NumberOfTickets = window.prompt('How many tickets would
         you like to buy? ', '');
         Number = parseInt (NumberOfTickets);
         }
while ((NumberOfTickets < 1 ) || (NumberOfTickets > 25 ));
Discount = 0.2;
if (NumberOfTickets < 10)
        {
        Discount = 0.0
        }
else
        {
            if (NumberOfTickets < 20)
            {
            Discount = 0.1
            }
        }
Cost = NumberOfTickets * 20 * (1 - Discount);
document.write('Your Tickets cost  ', Cost)
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>
```

Test data ideas – try zero, decimals, non-numeric

End-of-chapter questions

1 Both are used to store data for a program. The data stored as a variable can be changed during the execution of the program. The data stored as a constant cannot be changed.

2
- Integer
- Real
- Character
- Boolean

For examples see text.

3 a Python

```
Maths = int(0)
MathsHighest = int(0)
MathsLowest = int(100)
MathsTotal = int(0)
Science = int(0)
ScienceHighest = int(0)
ScienceLowest = int(100)
ScienceTotal = int(0)
English = int(0)
```

```
EnglishHighest = int(0)
EnglishLowest = int(100)
EnglishTotal = int(0)
IT = int(0)
ITHighest = int(0)
ITLowest = int(0)
ITTotal = int(0)
OverallHighest = int(0)
OverallLowest = int(100)
OverallTotal = int(0)
Student = int(600)
Count = int(0)
for Count in range (1, Student + 1):
      Maths = int(input( "Enter a Mark for Maths "))
      if MathsLowest > Maths:
            MathsLowest = Maths
      if MathsHighest < Maths:
            MathsHighest = Maths
      MathsTotal = MathsTotal + Maths
      if OverallLowest > Maths:
            OverallLowest = Maths
      if OverallHighest < Maths:
            OverallHighest = Maths
      OverallTotal = OverallTotal + Maths
      English = int(input( "Enter a Mark for English "))
      if EnglishLowest > English:
            EnglishLowest = English
      if EnglishHighest < English:
            EnglishHighest = English
      EnglishTotal = EnglishTotal + English
      if OverallLowest > English:
            OverallLowest = English
      if OverallHighest < English:
            OverallHighest = English
      OverallTotal = OverallTotal + English
      Science = int(input( "Enter a Mark for Science "))
      if ScienceLowest > Science:
            ScienceLowest = Science
      if ScienceHighest < Science:
            ScienceHighest = Science
      ScienceTotal = ScienceTotal + Science
      if OverallLowest > Science:
            OverallLowest = Science
      if OverallHighest < Science:
            OverallHighest = Science
      OverallTotal = OverallTotal + Science
      IT = int(input( "Enter a Mark for IT "))
      if ITLowest > IT:
            ITLowest = IT
      if ITHighest < IT:
            ITHighest = IT
      ITTotal = ITTotal + IT
      if OverallLowest > IT:
            OverallLowest = IT
      if OverallHighest < IT:
            OverallHighest = IT
      OverallTotal = OverallTotal + IT
print ("Highest mark for Maths is ", MathsHighest)
print ("Lowest mark for Maths is ", MathsLowest)
```

```
print ("Lowest mark for Maths is ", MathsLowest)
MathsAverage = float(MathsTotal/Student)
print ("Average mark for Maths is ", MathsAverage)
print ("Highest mark for English is ", EnglishHighest)
print ("Lowest mark for English is ", EnglishLowest)
EnglishAverage = float(EnglishTotal/Student)
print ("Average mark for English is ", EnglishAverage)
print ("Highest mark for Science is ", ScienceHighest)
print ("Lowest mark for Science is ", ScienceLowest)
ScienceAverage = float(ScienceTotal/Student)
print ("Average mark for Science is ", ScienceAverage)
print ("Highest mark for IT is ", ITHighest)
print ("Lowest mark for IT is ", ITLowest)
ITAverage = float(ITTotal/Student)
print ("Average mark for IT is ", ITAverage)
print ("Highest mark overall is ", OverallHighest)
print ("Lowest mark overall is ", OverallLowest)
OverallAverage = float(OverallTotal/(Student * 4))
print ("Average mark overall is ", OverallAverage)
```

b Start with one subject and set the number of students to a low value, for example 3.
Python

```
Maths = int(0)
MathsHighest = int(0)
MathsLowest = int(100)
MathsTotal = int(0)
OverallHighest = int(0)
OverallLowest = int(100)
OverallTotal = int(0)
Student = int(3)
Count = int(0)
for Count in range (1, Student + 1):
      Maths = int(input( "Enter a Mark for Maths"))
      if MathsLowest > Maths:
            MathsLowest = Maths
      if MathsHighest < Maths:
            MathsHighest = Maths
      MathsTotal = MathsTotal + Maths
      if OverallLowest > Maths:
            OverallLowest = Maths
      if OverallHighest < Maths:
            OverallHighest = Maths
      OverallTotal = OverallTotal + Maths
print ("Highest mark for Maths is ", MathsHighest)
print ("Lowest mark for Maths is ", MathsLowest)
MathsAverage = float(MathsTotal/Student)
print ("Average mark for Maths is ", float(MathsAverage))
print ("Highest mark overall is ", OverallHighest)
print ("Lowest mark overall is ", OverallLowest)
```

4 Python – test at start of loop

```
Number = int(0)
Count = int(0)
Sum = int(0)
while Count < 5:
          Number = int(input( "Enter a Whole Number: "))
          Sum = Sum + Number
          Count = Count + 1
print ("Sum of five numbers is ", Sum)
```

JavaScript – test at end of loop

```
<HTML>
<HEAD>
<TITLE> Repetition - While
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
var Number = 0;
var Count = 0;
var Sum = 0;
do
         {
          Number = window.prompt('Enter whole number', '');
          Number = parseInt(Number);
          Sum = Sum + Number;
          Count = Count + 1
          }
while (Count < 5);
document.write('Sum of five numbers is  ', Sum)
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>`
```

Python – fixed number of repetitions, remember this starts from 1 and stops **before** reaching 6

```
Number = int(0)
Count = int(0)
Sum = int(0)
for Count in range (1, 6):
           Number = int(input( "Enter a Whole Number: "))
           Sum = Sum + Number
print ("Sum of five numbers is ", Sum)
```

JavaScript – fixed number of repetitions

```
<HTML>
<HEAD>
<TITLE> FixedIteration
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
var Number = 0;
var Count = 0;
var Sum = 0;
for (var Count = 1; Count <= 5; Count = Count + 1)
          {
          Number = window.prompt('Enter whole number', '');
          Number = parseInt (Number);
          Sum = Sum + Number;
          }
document.write('Sum of five numbers is  ', Sum)
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>
```

The most efficient type of loop to use is a FOR loop with a fixed number of iterations.

5 a JavaScript

```
<HTML>
<HEAD>
<TITLE> Question 5
</TITLE>
<SCRIPT LANGUAGE = "JavaScript">
var SortsOfSweets = 500;
var SweetCode = 0;
var Chocolate = 0;
var Toffee = 0;
var Jelly = 0;
var Misc = 0;
for (var Count = 1; Count <= SortsOfSweets; Count = Count + 1)
       {
       SweetCode = window.prompt('Enter Sweet Code', '');
       SweetCode = parseInt(SweetCode);
       while ((SweetCode <= 999 ) || (SweetCode > 9999 ))
             {
             SweetCode = window.prompt('Enter 4 digit Sweet Code',
'');
             SweetCode = parseInt(SweetCode);
             };
      if (SweetCode < 2000)
             {
             Chocolate = Chocolate + 1
             }
      else
             {
             if (SweetCode < 3000)
                   {
                   Toffee = Toffee + 1
                   }
             else
                   {
                   if (SweetCode < 4000)
                         {
                         Jelly = Jelly + 1
                         }
                   else
                         {
                         Misc = Misc + 1
                         }
                   }
             }
      };
document.write('Types of Chocolates  ', Chocolate, '<BR>');
document.write('Types of Toffees  ', Toffee,'<BR>');
document.write('Types of Jellies  ', Jelly,'<BR>');
document.write('Other Types  ', Misc);
</SCRIPT>
</HEAD>
<BODY>
</BODY>
</HTML>
```

b Reduce the number of codes to enter to 10 for example.