National 5 SDD Assessment 2

Name	
Class Teacher	

Question 1 (1 mark)

Name suitable data types to store the following information

Computing 19	String
True/False	Boolean

Question 2 (2 marks)

The program below should ask the user for a Test Mark & display "You have passed" if it is over 50. Identify the errors in the code below.

…
Line 3 GET TestMark from user
Line 4 IF TestMark < 50 then
Line 5   SEND "You have passed" to Dsplay
Line 6 End If
…

Syntax Error	"Dsplay" instead of DISPLAY
Logic Error	< instead of >

Question 3 (1 mark)
Convert the following number to denary

11001101

128+64+4+8 + 1 = 205

Question 4 (1 mark)
Evaluate the output of the following code when a user enters the value 1
…
Line 3 GET number1 from user
Line 4 Number 2 = Number 1 * 5
Line 5 Total = Number 2 * 5 + 5
Line 6 Display Number 2 & Total
…

530

Question 5 (4 marks)

The value in number1 has to be validated between 1-100. Write input validation to ensure the user enters a number between this range.

```
Start Loop
        Get Number1 from User
        If Number1 <=1 or age >=100
                SEND "incorrect" to display
        End if
Loop Until Number1 >1 and < 100
```

Question 6 (1 mark)

Give 2 examples of extreme and exceptional test data for the algorithm above.

Normal	34, 45
Extreme	1, 50
Exceptional	-19, 105

Question 7 (1 mark)

Describe the purpose of encryption when sending information over the internet

If communication is intercepted online by a hacker then the content of that communication cannot be understood without the encryption key.

Question 8 (1 mark)

The SDD process is described as iterative. What does this mean?

Previous stages can be revisited at any time. For example you can go back to analysis if the client changes part of the project then your need to redesign> implement etc.

Question 9 (1 mark)

The school wants to reduce the impact of the IT on the environment. Name 1 thing they could do.

Change settings on the monitors
Set computers to go to standby after a set amount of time unused.

Question 10 (2 marks)

A vector graphic is created to draw an overhead view of the school. Name the tool used to create this object & state some of the attributes that have been stored.
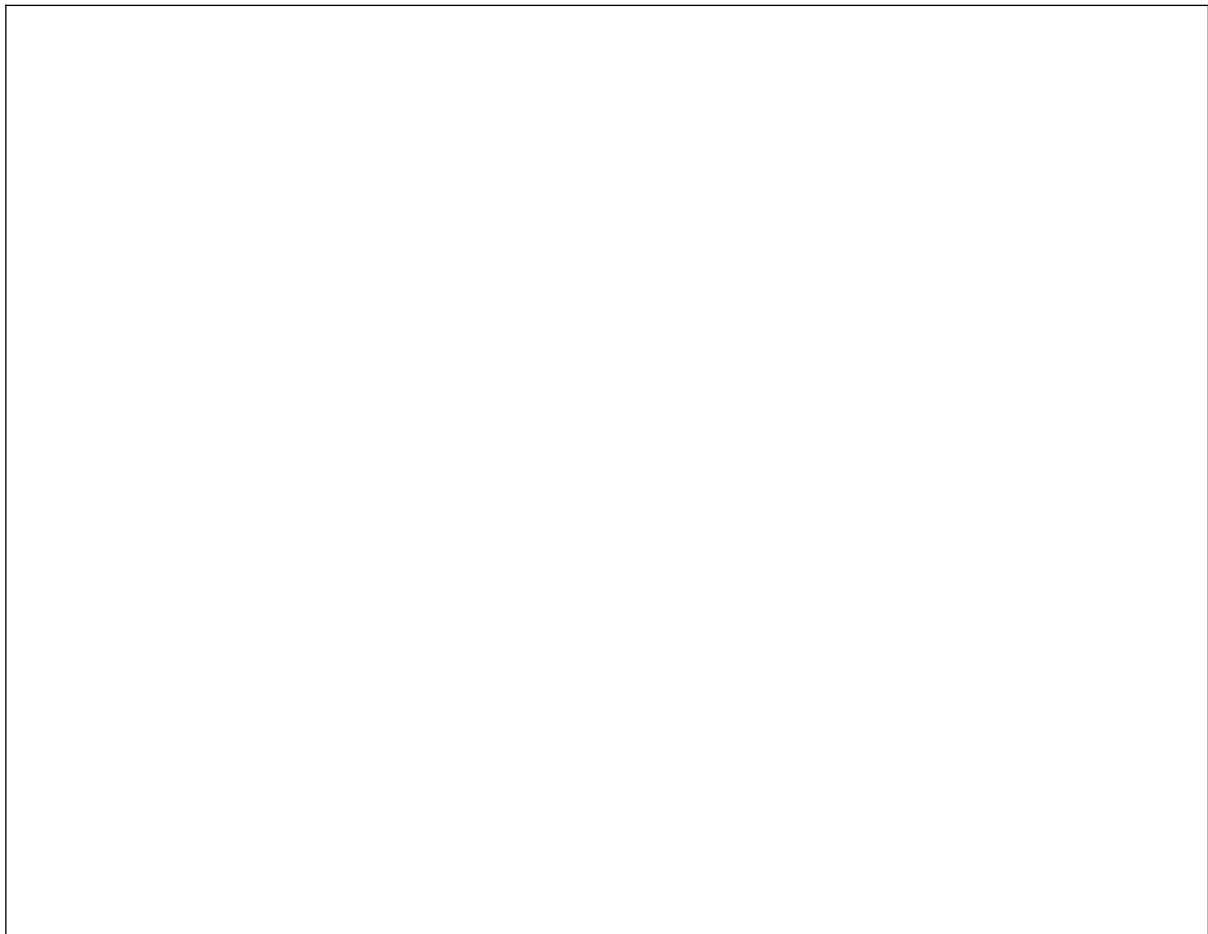
Ellipse

X & Y coordinates, Line colour

Question 11 (4 marks)

The school wants to have a pupil survey that is going to use a touch screen. They will be asked the following questions:

- Did you see any covid violations today?
- Was the school building clean?
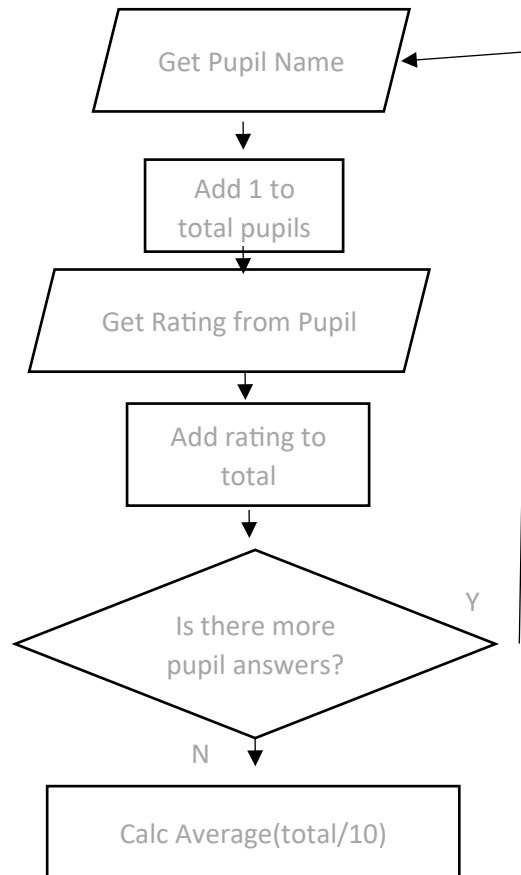- Rate your day out of 10

Design an interface that would be used on a tablet at the front of the school at the end of the day

Question 12

The flow chart below shows the program that will total and average the ratings

```
        ┌─────────────────────┐
        │   Get Pupil Name    │◄──────────┐
        └─────────────────────┘           │
                   │                       │
                   ▼                       │
        ┌─────────────────────┐           │
        │     Add 1 to        │           │
        │    total pupils     │           │
        └─────────────────────┘           │
                   │                       │
                   ▼                       │
        ┌─────────────────────┐           │
        │ Get Rating from Pupil│          │
        └─────────────────────┘           │
                   │                       │
                   ▼                       │
        ┌─────────────────────┐           │
        │   Add rating to     │           │
        │      total          │           │
        └─────────────────────┘           │
                   │                       │
                   ▼                    Y  │
          ◇─────────────────◇─────────────┘
          │  Is there more   │
          │  pupil answers?  │
          ◇─────────────────◇
                   │ N
                   ▼
        ┌─────────────────────┐
        │ Calc Average(total/10)│
        └─────────────────────┘
```

Identify a value in the flow chart that will be stored as an integer (1 mark)

Total Pupils

Identify the condition in the conditional loop (1 mark)

Are there more pupils?

The program does not calculate the average correctly. Explain why this is an how you could fix it.(1 mark)

The program assumes there are ten pupils when the average is being calculated. The calculation should be total / TotalPupils

Question 13 (6 marks)

Mr Hunter wants enter test results 1 – 100 and adds up all of the scores and calculates an average. Write an algorithm that will do this. There are 40 pupils in his class.

```
For counter = 1 to 40 **
        Do
                Score = inputbox("Please enter score") ***
                If score <1 or score >100 then   **
                        Msgbox("Incorrect data entered")
                End if

        Loop until score >=1 and score <=100  **

        Total = Total + Score ***

Next

Average = Total / 40 ***
```

Question 12 (2 marks)

State a suitable data structure for storing the test scores and the data type.

        Amber 87.1
        Adam 34.2
        David 23.2
        Alice 89.6

Data Structure	Array
Data Type	Real

Where in the Computer System would the test marks be stored when the program is running? (1 mark)

Registers

Question 13

…

Line 3 GET TeamName from user

Line 4 Calculate length of TeamName

Line 5 If NOT length > 15 then AND starts with A

Line 6 Length = Length * 3

Line 7 End if

Line 8 Display answer

…

Identify 2 logical operators in the code above (1 mark)

AND ,NOT

Using a function write a line of code that will calculate the length of the name variable for line 4 and store in the length variable. (1 mark)

Length = LEN(TeamName)

The first name entered is "TeamBelmont". How many bits are required to store this string using extended ASCII? (1 mark)

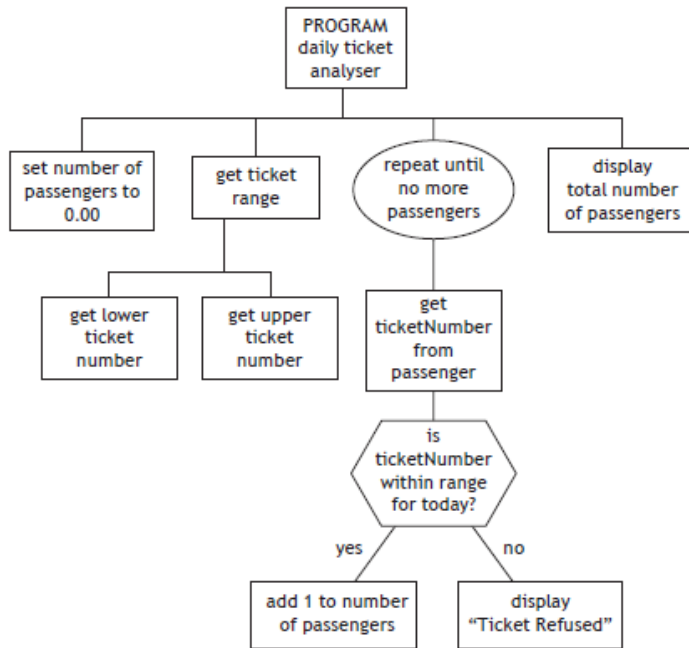8 bits for Extended ASCII so 8 x Number of characters in "Belmont"

8 x 12 = 96

Question 14

A company runs a trip round Ailsa Craig every weekend. The boat holds 50 passengers.

The program design is below.

What type of loop is used in this design? (1 mark)

Conditional Loop

Which of the Algorithms is being used in this design? (1 mark)

Running Total

A number of different programming constructs are being used. Complete the table below identifying which part of the flow chart demonstrates which construct. (3 marks)

Construct	Example from Flow Chart
Assignment	Set Num of passengers to 0
Conditional Statement	Repeat until
Arithmetic Operation	Is ticket number within range

Total number of passengers is set to 0.00 in the flow chart. Give a more suitable data type and explain why you have chosen this. (2 marks)

> Integer. Real is not suitable as you cannot get a fraction of a person.

Question 15

A program uses 2 IF Statements. This is not efficient and this means both IF statements are always checked. Write the IF statements below in a more efficient way. (3 marks)

If TestScore >= 50 and Test Score < 60 then

    Msgbox("You got a C pass")

End if

If TestScore >= 60 and Test Score < 70 then

    Msgbox("You got a B pass")

End if

If TestScore >= 70 then

    Msgbox("You got a A pass")

End if

> If TestScore >= 50 and Test Score < 60 then
>   Msgbox("You got a C pass")
> ElseIf TestScore >= 60 and Test Score < 70 then
>   Msgbox("You got a B pass")
> ElseIf TestScore >= 70 then
>   Msgbox("You got a A pass")
> End if

In the program above a test score is stored with a picture of each pupil. The images are stored as bitmap graphics. Explain how bitmap graphics are stored in a computer system.(1 mark)

> A grid of pixels where each pixel has a binary value.

Question 16

A factory uses a robot to scan items and measure their diameter. If they are the correct size they are put into boxes.

```
Line 1 DECLARE maxSize AS REAL INITIALLY 2.0
Line 2 DECLARE fullBox AS INTEGER INITIALLY 30
Line 3 DECLARE count AS INTEGER INITIALLY 0
Line 4 DECLARE itemSize AS REAL INITIALLY 0.0
Line 5 WHILE <there are more items to scan> DO
Line 6          RECEIVE itemSize FROM <scanner>
Line 7              IF itemSize >= maxSize/2 AND itemSize <= maxSize THEN
Line 8                      <pick and pack scanned item>
Line 9                      SET count TO count + 1
Line 10                     IF count = fullBox THEN
Line 11                             SEND "Box Full" TO TOUCHSCREEN
Line 12                             SEND "Replace with Empty Box" TO
TOUCHSCREEN
Line 13                             <pause until box replaced>
Line 14                             SET count TO 0
Line 15                     END IF
Line 16             END IF
Line 17 END WHILE
```

Explain how the program informs the user when a box is full. (3 marks)

> 1 is added o the counter every time an item is added and when the counter reaches 10 the user is informed that a new box is required.

What is line 14 used for?(1 mark)

> When a new box is put in it must reset the counter to 0 so it can start filling the box again.

The scanner on a second robot calculates the quality each item is and rates them 0-10

Line 1 DECLARE maxSize AS REAL INITIALLY 4.0
Line 2 DECLARE fullBox AS INTEGER INITIALLY 20
Line 3 DECLARE count AS INTEGER INITIALLY 0
Line 4 DECLARE quality AS REAL INITIALLY 0.0
Line 5 WHILE <there are more items to scan> DO
Line 6 RECEIVE itemSize FROM <scanner>
Line 7 IF itemSize >= maxSize/2 AND itemSize <= maxSize THEN
Line 8 <pick and pack scanned item>
Line 9 SET count TO count + 1
Line 10 IF count = fullBox THEN
Line 11 SEND "Box Full" TO TOUCHSCREEN
Line 12 SEND "Replace with Empty Box" TO TOUCHSCREEN
Line 13 <pause until box replaced>
Line 14 SET count TO 0
Line 15 END IF
Line 16 END IF
Line 17 END WHILE

Describe how you could add to line 7 so that only items with a quality of 5 or over would be picked by the robot.(2 marks)

Line 6 could be edited to input quality and the condition on line 7 should be changed to accept only items within the range

The program below was created by a pupil.

```
for counter in range(0,10):
print("Enter your percentage mark")
mark=int(input())
if mark >= 90:
print("You have achieved a grade A")
elif mark >= 70 and mark < 90:
print("You have achieved a grade B")
elif mark >= 50 and mark < 70:
print("You have achieved a grade C")
elif mark >= 40 and mark < 50:
print("You have achieved a grade D")
else:
print("You failed the test")
```

Describe two ways the pupil could make their program more readable.(2 marks)

Method 1: Indentation to space out constructs

Method 2: Use of white space

Question 18

A program for a concert is created so that if a customer spends £70 or more on tickets they are eligible for an in store discount. Part of the program is below.(2 marks)

```
….
Line 30 IF total < 70 THEN
Line 31 SEND "Sorry you are not eligible for a discount" TO DISPLAY
Line 32 ELSE
Line 33 IF totalcost >= 150 THEN
Line 34 SEND "You are eligible for a 20% discount." TO DISPLAY
Line 35 ELSE
Line 36 SEND "You are eligible for a 10% discount." TO DISPLAY
Line 37 END IF
Line 38 END IF
….
```

State the output is the total cost is 75

You are eligible for a 10% discount.

State the output if the total cost is 150

You are eligible for a 20% discount.