PINEHURST SCHOOL	**Year 1010 Computer Science Final Examination MS**	
Mark:	November 7E7	Name:
	Maximum: 1011010	Teacher: Mr Jaques Ms Lui *Circle your teacher's name*
Time: 5A min		

Answer all questions on this paper.
Calculators are NOT allowed.
You should aim to spend about 1 minute per mark allocated.

1. Complete the table EXCEPT in the shaded squares (working space below the table). [13]

Denary Number	Binary Number	Hexadecimal Number
15	1111	F
60	111100	3C
10	1010	A
157	1001 1101	9D
206	1100 1110	CE
255	1111 1111	FF

2. Bob's grandfather says that computers are for doing calculations with numbers. Explain why his belief is both partly true and partly false. You should use your understanding of the development of technology to provide a thorough answer to this question. [5]

- Initially they were designed to process numbers – examples would be ENIAC and Babbage's calculating machine
- The problem was to find a way of doing time-consuming calculations such as firing tables
- When this problem was solved people found that the technology could be used for other things
- An example would be handling letters, by using the ASCII code.
- So the computer is still actually handling numbers in a binary sense, but we use the numbers to code for other things
- This allows the computer to solve other problems

3. What is the purpose of the ASCII code? [2]

- It is a way of allowing a byte to represent a letter in the alphabet

4. Run-Length Compression is one type of compression method. [5]

(a) Describe in general terms how this method is performed and what type of file it might be used on.

- You run through the data looking for repeated bytes
- Instead of writing all the repeats, you say what the byte is and how many times it occurs
- It can be used particularly on photographs because it will often have the same colour in patches across the image

(b) This is a lossless compression method. Explain what this term means.

Lossless means that the compression can be reversed to recreate the original image exactly, with no information lost.

5. Consider QR codes and barcodes. Give 1 advantage and 1 disadvantage of QR codes compared to barcodes. [2]

Advantage of QR codes:

- They can store more data
- Readers are more readily available

Disadvantage of QR codes:

- They are more complex to read and process (take longer)
- They take up more space (??)

6. Name 2 methods that have been used in the past to store one bit of data. [2]

- Magnetic particles (tape or hard disk)

- Punchcard or paper tape
- Vacuum tubes

7. Why is it important to have a strong password? [2]

A strong password makes it more difficult for someone to guess or hack your password and therefore makes it harder for them to access your information.

8. Explain what a "phishing" attack is. [2]

This is where a hacker tempts you to give them passwords or usernames.

9. Data can be transmitted using a duplex connection. [2]

(a) Compared to a simplex connection, give 1 advantage of a duplex connection.

It can transmit in **both** directions.

(b) Compared to a simplex connection, give 1 disadvantage of a duplex connection.

It is more **expensive** to design and build.

10. Explain why protocols are needed for the operation of the Internet. [2]

There needs to be some **agreed method** to do the **data transmission** from one network to another.

11. What does each acronym stand for? [2]

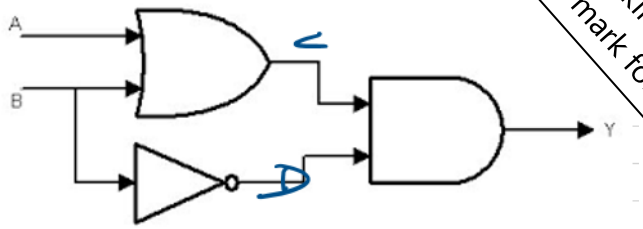
- URL

Universal resource locator

- TCP

Transmission control protocol

12. Complete the truth table for this logic circuit [2]



A	B	C	D	Y
0	0	0	1	0
0	1	1	0	0
1	0	1	1	1
1	1	1	0	0

1 mark for a correct column of working
1 mark for correct column for Y

13. Two examples of output devices are a 3D printer and a 3D cutter. [5]

(a) The table contains four statements about 3D printers and 3D cutters. Tick (√) to show which statements apply to each output device (some statements may apply to both output devices). *One mark for each correct line in the table.*

Statement	3D printer (✓)	3D cutter (✓)
Outputs a physical 3D product	✓	✓
Uses a high powered laser to create the output		✓
Creates 3D prototypes	✓	✓
Uses layers of material to create the output	✓	

(b) Name the type of software used to create the computerised designs for 3D printing.

.....CAD (Computer-Aided Design) .....

14. What is the purpose of comments in code? [2]

They help later readers to understand what each piece of code does.

15. What is the difference between a string and an integer? [2]

A string is a list or array of characters (in ASCII code) whereas an integer represents a whole number which can be negative.

16. What is the difference between a **for** loop and a **while** loop? [2]

A for loop handles increasing the loop_counter for you, whereas if you use a while loop you have to increment it yourself.

17. Write down the **output** for this piece of code: [3]

```
for n in range(1,5):
    print("Term ",n,"is ",n*n)
```

Term 1 is 1
Term 2 is 4
Term 3 is 9
Term 4 is 16

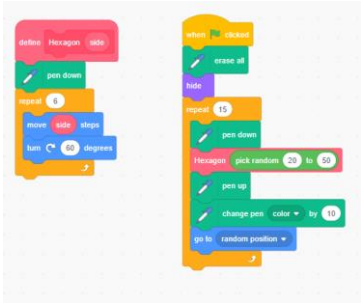
18. This code will not work properly. There are 4 errors in the code (line numbers are given). [4]

```
1   #Code to print a sequence
2   MaxN=4 #how many terms in the sequence to print
3   Start=input("What would you like the sequence to start on? ")
4     Factor=float(input("What would you like the sequence to multiply up by? "))
5   for n in range(1,MaxN)
6     Print("Term ",n,"is ",Start*Factor**(n-1))
```

What are the 4 errors? Use the line numbers to explain which line you are referring to.

4: the line is indented
[5: the loop will only go to MaxN-1]
5: there is no colon on the end of the line
6: print should not have a capital letter
6: Start is a string not a number, so you can't use it for calculations

19. Describe what this Scratch code will do. [5]



It will draw

- 15
- hexagons
- of random size
- at random locations
- with gradually changing colour

20. You have been asked to write code to take a string from the user and output it in reverse order.

As an example, if the string was **I am a string** then when it is reversed, it would be **gnirts a ma I**.

(a) Write a plan to reverse a string using pseudocode [4]

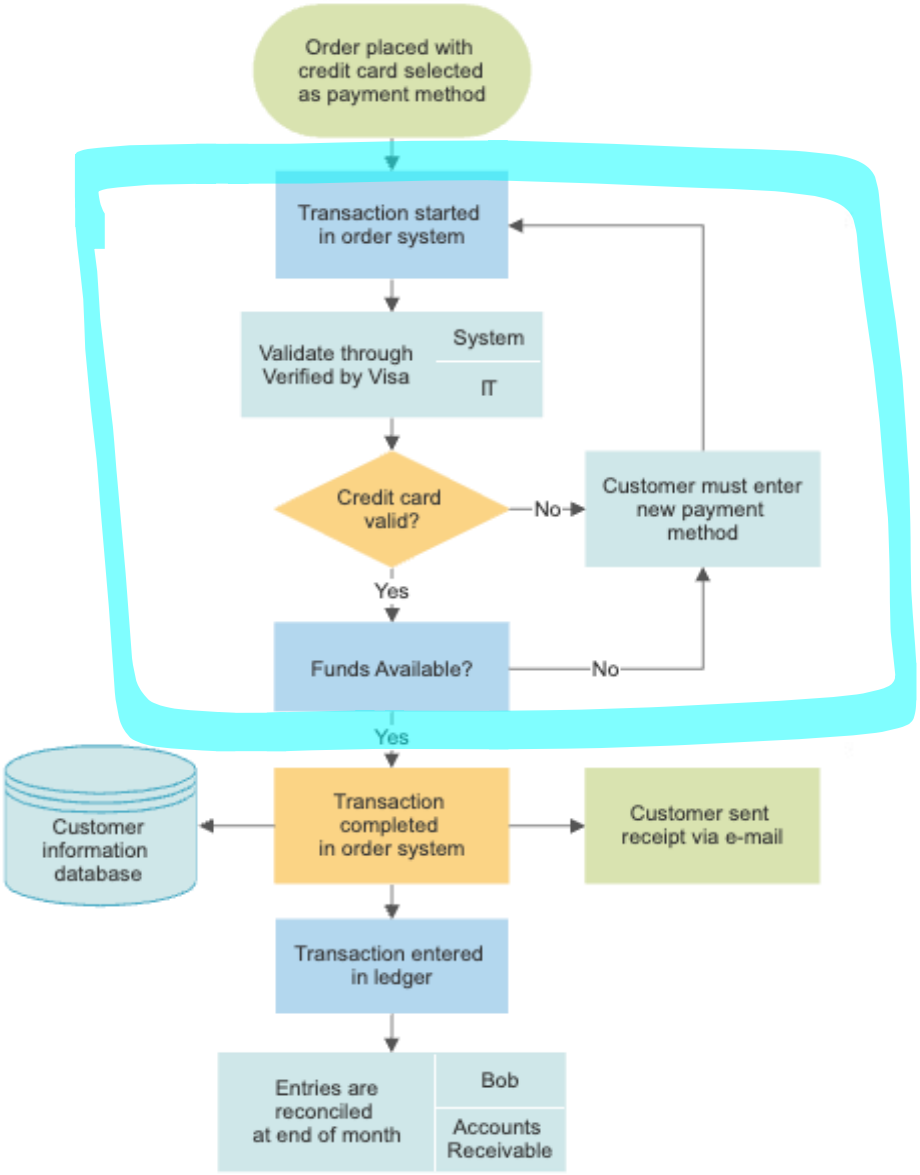
Input the string
Find the length to the string
Loop through the string from the back to the front
    Assemble the letters as you go

(b) Write code in Python to do this. [4]

```
String=input("Enter your string to reverse: ")
EndOfString=len(String)
NewString=""
for loop in range(EndOfString-1,-1,-1):
    NewString=NewString+String[loop]
print(NewString)
```

- Input
- Loop
- Loop works (approx)
- output

21. The following flowchart describes the process of paying for an item online. [3]



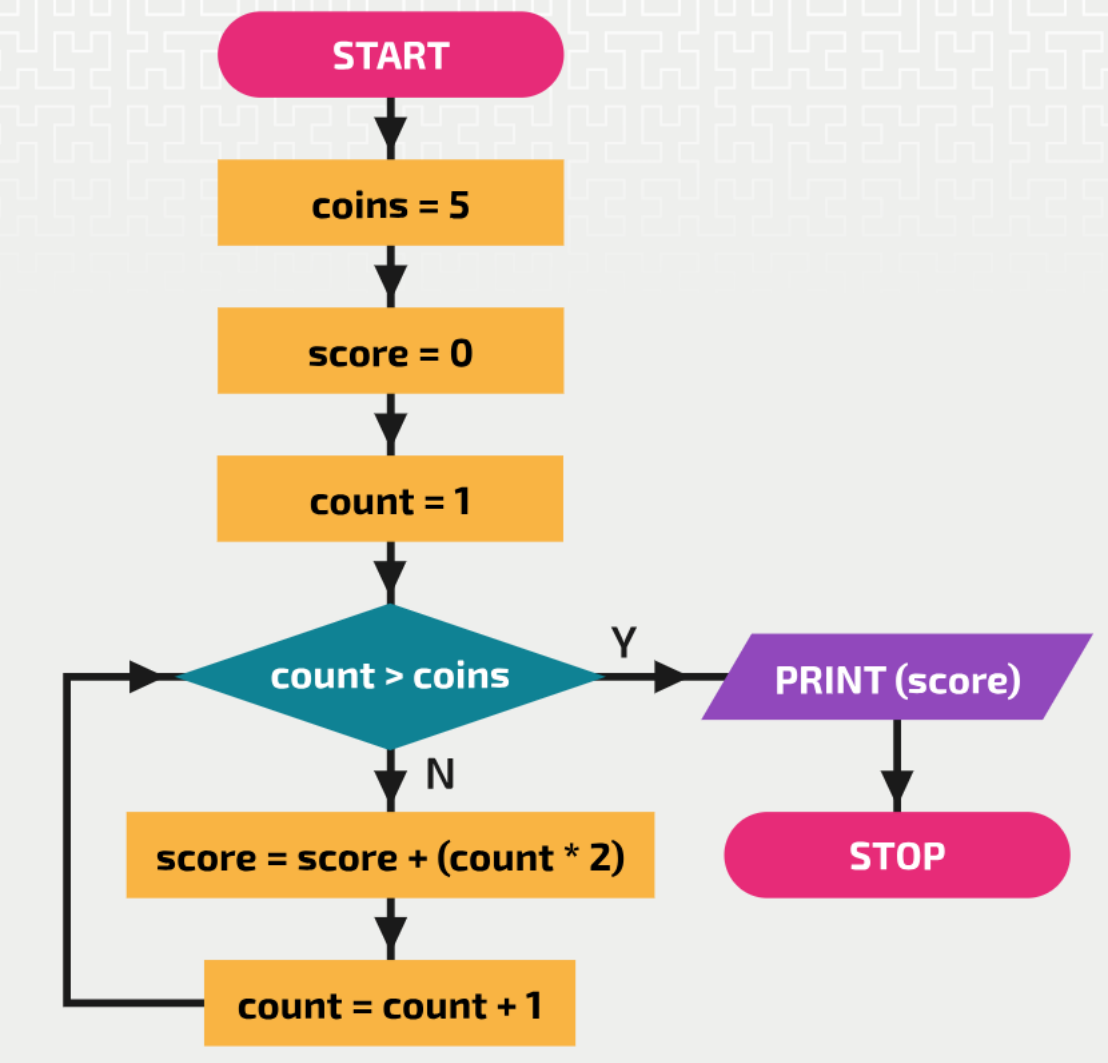
(a) The shape of one of the boxes is incorrect. Which box is that, **and** what shape should it be?

- the blue "Funds Available" box
- should be a diamond since it is asking a question

(b) Circle the part of the flowchart which describes a loop.

above

22. Here is a flowchart. Fill in the trace table (below) for this algorithm. [4]



Coins	Score	Count	Output
5	0	1	
5	2	2	
5	6	3	
5	12	4	
5	20	5	
5	30	6	30
One mark for each correct column			

23. A client wants you to find the checksum for the ID number on an item in their store. The ID number has 6 digits and the checksum is formed by:

- Multiplying the numbers in pairs to form products
- Adding these products up to form a total
- The checksum is the last digit of the total

Example: 123467 →

- Products are 1x2 = 2, 3x4 = 12, 6x7 = 42
- Total = 2 + 12 + 42 = 56
- Checksum = 6

Your code needs to allow the customer to input one ID number and then print out both the product number and its checksum.

You should use the space below to plan your code, in English or pseudocode. On the next page are lines on which you should write your program in Python. [7]

For example:

Input ID number from user

Make the 3 products

Add the 3 products together → total

Get the last digit of the total → checksum

Print the ID number and the checksum

- Plan contains most elements
- Plan contains all elements
- Plan would work

Code:

- Code to input ID number and change to **int** is made somewhere
- Products generated
- Total generated and last digit extracted
- Output as required