Rugby School

Sixth Form Entrance Examination

COMPUTER SCIENCE
SPECIMEN

Time allowed: **1 hour**

Name: _____

INSTRUCTIONS TO CANDIDATES

- Write your name above.
- Do not open the paper until instructed to do so.
- A calculator **is not allowed** for this paper.
- Write clearly and fully where the questions request it.
- There are three sections in this paper. You must answer all questions in each section.
- The maximum mark for this paper is [**55** marks]

November 2019

Section A - Hardware and Software

1. Describe the difference between **primary** and **secondary** storage in a computer. Provide one example for each. **[4]**

2. Give three examples of the roles of an operating system. **[3]**

3. (a) Match the following type of media to their corresponding average capacity. **[3]**

• BluRay Disk	• 512 GB - 6 TB
• Hard Disk	• 4.7 GB - 8.5 GB
• DVD	• 25 GB - 50 GB
• Solid State Drive	• 4GB - 2 TB
• CD-ROM	• 700 MB

   (b) State what the abbreviation **ROM** stands for in "CD-ROM". **[1]**

   (c) Arrange the following storage types from slowest to fastest access speed: magnetic, optical and solid state. **[2]**

   (d) Explain why you would expect a BluRay disk to have a higher access speed than a CD-ROM. **[2]**

4. Extra information stored with an image is called *metadata*. Give two examples of image metadata. **[2]**

5. (a) Define what a CPU is in a computer. **[1]**

(b) Briefly explain the steps involved in the Fetch-Decode-Execute cycle. **[4]**

6. Ryan brags that he uses his new headphones to only listen to "FLAC, because it is a lossless file format". Explain what Ryan means by *lossless file format*. **[3]**

Turn over for next section

Section B - Programming

7. Given that $a = 7$ and $b = 6$, state what appears on the screen when each of the following snippets of code is executed.

   (a)
   ```
   if a > 7 or b = 1 then
     print Yellow
   else
     print Blue
   end if
   ```
   [1]

   (b)
   ```
   if NOT(a > b) or (b ≤ 7) then
     print Red
   else if NOT(a > b) or (b ≥ 7) then
     print Blue
   else
     print Green
   end if
   ```
   [1]

8. The following pseudocode is intended to find and display the largest number in an array of ten positive integers.

   ```
   max = numbers[0]
   for n = 0 to 9 do
     if max > numbers[n] then
       max = numbers[n]
     end if
   end for
   print max
   ```

   The pseudocode contains an error and does not work as intended. State the line of code that contains the error and suggest a correction. **[2]**

9. Describe and explain two advantages of writing code using sub-routines. **[4]**

10. An estate agent keeps details of all the properties they have available for rent.

PropertyID	Type	MonthlyRent	Beds	Furnished	DistanceToStation
1	Apartment	£800.00	2	Y	0.3
2	Semi	£475.00	2	N	1.5
3	Apartment	£1150.00	3	N	0.5
4	House	£1500.00	4	Y	0.2
5	Apartment	£900.00	2	Y	0.3
6	Apartment	£1250.00	3	Y	0.2
7	Semi	£550.00	3	Y	2.4
8	House	£600.00	3	N	0.6

List the Property IDs of the properties that will be found by the following SQL queries. **[4]**

(a) SELECT *
FROM tblRental
WHERE MonthlyRent $\leq$ 550.00 OR Furnished = 'Y'

(b) SELECT *
FROM tblRental
WHERE Type = "Apartment" AND DistanceToStation < 0.3

11. Jimmy produces the following algorithm.

```
1: limit = input("Please enter an upper limit")
2: x = 0
3: while x < limit do
4:     print x
5:     x = x + 2
6: end while
```

(a) Write down the outputs for the algorithm for an input of 9. **[2]**

(b) Jimmy intended this algorithm to print the first 9 non-negative even numbers in this case. Explain what this algorithm does instead. **[2]**

(c) Suggest how line 4 and line 5 can be changed to make the algorithm work as intended without changing any other part of it. **[3]**

12. Write pseudocode that will perform the following:

Ask a user to enter a number.

If the number is between 0 and 10, output the word **blue**.

If the number is between 10 and 20, output the word **red**.

If the number is between 20 and 30, output the word **green**.

If it is not in the accepted ranges above, output a message to say that this is not a correct colour option. **[6]**

Turn over for next section

Section C - Implications of Computer Use

13. Artificial Intelligence is increasingly used in everyday life of people, but also at more technical levels to provide advice on medical, financial and other matters.

    (a) Provide an example of how AI is used in everyday life, or at a technical level. **[1]**

    (b) Discuss the potential ethical and cultural issues associated with the application you have stated. Marks will be awarded for clarity of argument and knowledge of relevant information. **[4]**

End of paper