1(a) In a computer game, a player collects items. Each item has a score. The score for each item is stored using the data type **real**.

State what is meant by the data type **real**.

[1]

(b) The result of a computer game can be a win, a loss or a draw. The result is stored in a variable with the identifier `result`.

i. State why `result` **cannot** be stored using a Boolean data type.

[1]

ii. Give a suitable data type for `result`. Explain your answer, showing how each result could be stored.

Data type

Explanation

[2]

2 OCR Security Services is a company that installs intruder alarm systems in commercial buildings.

The systems use a computer that is connected to the door sensors and window sensors.

The following data is stored in the system:

Data stored	Variable identifier	Example data
The user's name	`UserName`	Admin123
A telephone number to call when the alarm is activated	`EmergencyPhoneNumber`	+449999999999
Whether a door sensor is activated	`DoorSensorActive`	True
Whether a window sensor is activated	`WindowSensorActive`	True
A timer that counts, to the nearest second, how long a door sensor has been activated	`DoorActiveTime`	100
A timer that counts, to the nearest second, how long a window sensor has been activated	`WindowActiveTime`	100
Whether the system is armed	`SystemArmed`	True
Whether the system is in test mode	`TestModeActive`	True

Below is a table showing some variables within the program.

Tick (✓) **one** box in each row to identify the most appropriate data type for each variable.

Variable	Boolean	Char	String	Integer	Real
`UserName`					
`EmergencyPhoneNumber`					
`DoorSensorActive`					
`DoorActiveTime`					

[4]

3 Each member of staff that works in a restaurant is given a Staff ID. This is calculated using the following algorithm.

```
01 surname = input("Enter surname")

02 year = input("Enter starting year")

03 staffID = surname + str(year)

04 while staffID.length < 10

05 ? staffID = staffID + "x"
```

```
06 endwhile

07 print("ID " + staffID)
```

i. Define the term **casting and** give the line number where casting has been used in the algorithm.

Definition ----------

Line number ----------

[2]

ii. Complete the following trace table for the given algorithm when the surname "Kofi" and the year 2021 are entered.

You may not need to use all rows in the table.

Line number	surname	year	staffID	Output
01	Kofi			
02		2021		

[4]

4 Customers at a hotel can stay between 1 and 5 (inclusive) nights and can choose between a basic room or a premium room.

A typical booking record is shown in the table:

firstName	Amaya
surname	Taylor-Ling
nights	3
room	Premium

stayComplete	False

i. State the most appropriate data type for the following fields:

Nights .....

Room .....

[2]

ii. Give the name of **one** field that could be stored as a Boolean data type.

.....

[1]

iii. Booking records are stored in a database table called `TblBookings`.

The following SQL statement is written to display all customer bookings that stay more than one night.

```
SELECT ALL

FROM TblBookings

IF Nights < 1
```

The SQL statement is incorrect.

Rewrite the SQL statement so that it is correct.

.....

.....

.....

.....

.....

.....

.....

[4]

5 A teacher researches the length of time students spend playing computer games each day.

Tick (✓) **one** box to identify the data type you would choose to store the data and explain why this is a suitable data type.

Data Type	Tick (✓) one box
String	
Integer	
Real	
Boolean	

Explanation: _____

_____

[2]

END OF QUESTION PAPER

<table>
<tr><th colspan="3">Question</th><th>Answer/Indicative content</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>a</td><td></td><td>• number with decimal places / fractional part</td><td>1
(AO1 1a)</td><td>Do not accept examples on their own.</td></tr>
<tr><td></td><td>b</td><td>i</td><td>• Boolean has two possible values / True or False // Result has three possible values // result has more than two options</td><td>1
(AO2 1a)</td><td>The results are words and not Boolean values.</td></tr>
<tr><td></td><td></td><td>ii</td><td>1 mark for data type, 1 mark for matching justification.

• String…
• …can store "win", "loss" or "draw" // equivalent
• Char…
• …can store "W", "L" or "D" // equivalent
• Integer / Real…
• …can store 0, 1, 2 // equivalent</td><td>2
(AO2 1a)</td><td>Allow other sensible explanation that shows candidate has considered how each of the three states could be stored.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
<tr><td>2</td><td></td><td></td><td>1 mark for each row

<table><tr><th>Variable</th><th>Boolean</th><th>Char</th><th>String</th><th>Integer</th><th>Real</th></tr><tr><td>UserName</td><td></td><td></td><td>✓</td><td></td><td></td></tr><tr><td>EmergencyPhoneNumber</td><td></td><td></td><td>✓</td><td></td><td></td></tr><tr><td>DoorSensorActive</td><td>✓</td><td></td><td></td><td></td><td></td></tr><tr><td>DoorActiveTime</td><td></td><td></td><td></td><td>✓</td><td></td></tr></table></td><td>4
(AO3 2a)</td><td>No mark if more than 1 tick on a row.

Allow other indications of choice (e.g. cross) as long as clear.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
<tr><td>3</td><td></td><td>i</td><td>• Convert/change one data type to another
• Line 03 // 3 // three</td><td>2
(AO1 1b)
(AO2 2b)</td><td>Do not accept "change to string” - this is the use in this example but not a definition.

<u>Examiner’s Comments</u>

Many candidates correctly defined casting as changing data from one data type to another. Some candidates defined this term as changing a variable from an integer to a string, which is only one example of what can be done and not a definition.

The majority of candidates then gave the correct line number (line 03) for there this was shown the example code given.</td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer/Indicative content</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td>ii</td><td>• Kofi2021 as staffID on line 03
• Kofi2021x as staffID on line 05
• Kofi2021xx as staffID on line 05
• ID Kofi2021xx output on line 07 as first and only output</td><td>4
(AO3 2c)</td><td>Max 2 if incorrect order. Ignore misspelling of Kofi

Penalise lack of / errors with line numbers once then FT. Ignore capitalisation. Ignore additional lines unless outcome impacted.

<code>staffID</code> does not have space in. Output does have a space in. Penalise spaces once then FT. Do not penalise unless obvious.

Quotes around answer is OK, but do not allow quotes around partial answers, e.g. <code>“ID” Kofi2021xx</code> is incorrect.

<table>
<tr><th>Line number</th><th>surname</th><th>year</th><th>staffID</th><th>Output</th></tr>
<tr><td>01</td><td>Kofi</td><td></td><td></td><td></td></tr>
<tr><td>02</td><td></td><td>2021</td><td></td><td></td></tr>
<tr><td>03</td><td></td><td></td><td>Kofi2021</td><td></td></tr>
<tr><td>05</td><td></td><td></td><td>Kofi2021x</td><td></td></tr>
<tr><td>05</td><td></td><td></td><td>Kofi2021xx</td><td></td></tr>
<tr><td>07</td><td></td><td></td><td></td><td>ID Kofi2021xx</td></tr>
</table>
<u>Examiner’s Comments</u>

This question asked candidates to trace through a given algorithm to show the value of three variables at various points in the algorithm.

The algorithm itself was relatively simple. It used condition-controlled iteration to repeat while the length of the username was less than 10 characters.

Most candidates gained the first 2 marks for the initial changes to <code>staffID</code>. However few candidates were able to trace through the iteration and conclude that the final username should end up as ID Kofi2021xx.

Marking this question considered the spaces within the username at various points. The algorithm results in one space only, in between ID and Kofi2021xx.</td></tr>
</table>

Question			Answer/Indicative content	Marks	Guidance
					Where extra spaces appeared or were missed, this was penalised. However, examiners were instructed to give clear benefit of doubt, and to only do this if the space was clearly present/missing. It is important to understand that “ab” and “a b” are two strings that are not the same. This level of precision should be encouraged within GCSE Computer Science. Experience of practical programming will help reinforce the impact of spaces within programming and algorithms.
			Total	6	

Question			Answer/Indicative content	Marks	Guidance
4		i	• Integer • String	2 (AO3 2a)	Accept other valid data types from high-level languages (e.g. byte, short for integers) Do not accept descriptions (e.g. “whole number”, “text”). Do not accept “character(s)” for string.
		ii	• stayComplete	1 (AO3 2a)	Ignore spaces or misspelling as long as recognisable. <u>Examiner’s Comments</u> These questions tested candidates’ knowledge of data types and it was clear that this knowledge was well understood. The majority of candidates were able to correctly identify suitable data types in section (i) and identify `stayComplete` as the field that would be stored as a Boolean data type.

Question			Answer/Indicative content	Marks	Guidance
		iii	• `SELECT FirstName, Surname, Nights, Room, StayComplete // SELECT*` • `FROM TblBookings` • `WHERE` • `Nights > 1 // Nights >= 2 // Nights BETWEEN 2 AND 5.`	4 (AO3 1) (AO3 2c)	Order of fields for BP1 not important but must show all fields and be separated by commas. Ignore capitalisation and spacing. Spelling must be correct. Ignore quotes around numeric values or field/table names. Allow other logically valid SQL statements. Check with TL if required. Ignore reference to `stayComplete` or other valid SQL code that would not affect output. Max 3 if in wrong order or if includes any extra invalid code <u>Examiner's Comments</u> This question tested candidates' ability to refine and rewrite incorrect code given to them. It is important to note that although the SQL statement as a whole is incorrect, not all components are incorrect; in this case, the `FROM` clause is correct and candidates who made no change to this line were credited. `SELECT ALL` is invalid SQL and should have been written to instead include all fields from the table, separated by commas `SELECT *` was equally accepted as a suitable response. `IF` is not a valid SQL keyword and needs to be replaced with `WHERE`. The criteria for this statement was also incorrect. The comparison symbol is incorrect and should read `Nights > 1`. Most candidates gained some marks on this question. The most common response corrected the criteria and not modifying the `FROM` clause.
			Total	7	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
5			Integer (1)… • …number of seconds not important (1) • … level of accuracy not needed so round to nearest minute (1) • …using a decimal to store seconds (0-60) is not appropriate (1) Real (1)… • … number of seconds may be important (1) • … allows parts/fractions to be stored over integers (1)	1 (AO3 2a) 1 (AO3 1)	One mark for appropriate data type identified. One mark for appropriate justification linked to the data type chosen.
			Total	2	