Databases – 2021/20 IGCSE 0417

1. Nov/2021/Paper_13/No.4

4 A library system has two tables; one for borrowers and one for books. Extracts from these tables are shown.

Borrower_ID	Borrower_name	Contact_telephone	Contact_email
5404	Susan Stranks	01632 960321	rockit@cambridgeinternational.org
9867	Fei Hong Zhao	07700 900222	tawara@cambridgeinternational.org

Borrowers table

Book_ID	ISBN	Name_of_book	Author_of_book	Date_published	Borrower_ID	Date_due_back
1	0859550153	Bird of Prey	David James	1977	5404	27/10/2021
34	3301028345	The Fifth Man	Colin Turner	1998	9324	05/10/2021
35	4237681321	A View of the Temple	Yu Yan Zhang	2017	8854	07/10/2021
59	4237681321	A View of the Temple	Yu Yan Zhang	2017	5404	27/10/2021

Books table

(a) Name the most appropriate validation check for each of these fields. Your answer must be different for each field.

ISBN .....

Date_due_back .....
[2]

(b) **(i)** For the books table, name the most appropriate field that could be used as a primary key.

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(ii) The librarian has created a relationship between the books table and the borrowers table.

For the books table, name the most appropriate foreign key field that would be used to create the relationship.

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(c) The data type for Contact_telephone has been set as text.

Explain why this field has been set to text rather than integer.

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(d) At the end of each day the tables are searched to issue reminders to borrowers about books that are overdue.

Describe the automatic processing involved in searching and issuing of reminders for overdue books.

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2. Mar/2021/Paper_12/No.9

Tawara school uses an optical mark recognition (OMR) system for its school register. An example of the register is shown. For each session of the school there are two lozenges to be shaded in.

Tawara School

Pupil Registration form

INSTRUCTIONS: Only use HB pencil when completing this form

Example:

Pupil present [■] [A] Pupil absent [P] [■] Pupil late [■] [■]

No.	Pupil Name	Mon		Tues		Weds		Thurs		Fri	
		am	pm	am	pm	am	pm	am	pm	am	pm
01		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
02		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
03		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
04		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
05		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]
06		[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]	[P] [A]

At the start of the registration period the teacher shades in a lozenge [P] on the register to show that a pupil is present and shades in a lozenge [A] for each pupil who is absent. If a pupil is late then the teacher shades in both the [P] and the [A] lozenges. The register sheets are sent to the school office to be processed and the data from them is stored in the computer's database.

(a) Describe the inputs and computer processing of the registers when they are sent to the school office, prior to them being stored on the computer's database.

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(b) The headteacher of the school is considering modernising the registration system so that pupils can register using a facial recognition system.

Discuss the advantages and disadvantages of using a facial recognition registration system rather than the OMR system they currently use.

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(c) Biometric data, like facial recognition, is an example of personal data.

Give **two** other examples of personal data that could be stored on the school registration database.

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3. Mar/2021/Paper_12/No.11

The owner of a bookshop has a database of all the books she has in stock. As some of the data is being entered into the database it is checked using validation checks.

An example of some of the records in the database is shown.

Field name	Example data
Name of book	Brotherhood of Wisdom
Name of author	Colin Turner
ISBN	471837951
Date of purchase	25/02/2021
Number of copies	10
Type of book	E
Name of book	The Fourth Man
Name of author	Aadha Khatri
ISBN	0718121753
Date of purchase	18/03/2019
Number of copies	53
Type of book	H
Name of Book	Indian Temples
Name of author	Vihaan Laghan
ISBN	978147183215
Date of purchase	12/02/2019
Number of copies	30
Type of book	H

Explain, using a field name and examples of the data stored in that field in the database, why validation checks must be appropriate to the data that is being checked.

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4. June/2021/Paper_11/No.7

A systems analyst has created a new computer system to keep records in a medical centre. She has created a relational database to store the medical records of patients.

The database uses primary and foreign keys.

(a) Describe what is meant by a relational database.

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(b) Explain the difference between a primary key and a foreign key.

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(c) A dentist works at the medical centre. The dentist stores the medical records of his patients.

Describe **four** other uses of the database software that the dentist can use to help him in his work.

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(d) The data stored on the computer system needs to be protected from unauthorised access.

Discuss the effectiveness of different methods of increasing security of this data.

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5. June/2021/Paper_12/No.5

5 Petr has set up a database for a science project on planets in the solar system. Part of the database is shown.

ID	Name_of_planet	Number_of_moons	Orbital_period	Rings	Gravity	Type_of_planet	First_observed
4	Mars	2	1.88	N	0.38	Regular	1610
5	Ceres	0	4.61	N	0.27	Dwarf	1801
7	Saturn	62	29	Y	1.16	Gas Giant	1610
9	Neptune	14	165	Y	1.21	Gas Giant	1846
10	Pluto	5	248	N	0.62	Dwarf	1930
11	Haumea	1	309	N	0.401	Dwarf	2004

(a) When Petr was designing his database, he had to set the data types for each field. Complete the design table below by filling in the data types for each named field. Use the **most** appropriate data type. Each data type must be different. For any numeric field, specify the type of number.

Field name	Data type
Number_of_moons	
Orbital_period	
Rings	
Name_of_planet	

[4]

(b) Operators such as AND, OR, NOT, LIKE, >, >=, <, <=, =, <> can be used to search Petr's planet database. The search criteria for all the gas giant planets with more than 20 moons would look like this:

Type_of_planet = "Gas Giant" AND Number_of_moons > 20

Write down the search criteria that will produce a list of planets that are not gas giants but have at least one moon and were first observed after 1800.

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(c) Write down the names of the planets that are not gas giants but have at least one moon and were first observed after 1800.

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(d) Petr has copied the data from the Orbital_period field into a spreadsheet. The data for the orbital period for Mars, 1.88, is stored in cell A2. In cell B2 he has entered a function of:

ROUND(A2,0)

Explain in detail the function used in cell B2.

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6. June/2021/Paper_13/No.10

Aimi works for a shop that sells toys. She is setting up a relational database of the stock in the shop. She has started designing the database. Aimi has written down the questions that are asked about each toy and needs to produce appropriate field names from them. An example of the type of data that is to be stored is shown.

What is the toy? Tawara Doll

Who manufactured the toy? Tinky

What year was it manufactured? 2020

What price was it bought for? $12.99

(a) Complete the design table below by filling in an appropriate field name for each question. Each field name must be different. Field names must not include spaces.

Question	Field name
What is the toy?	
Who manufactured the toy?	
What year was it manufactured?	
What price was it bought for?	

[4]

(b) When Aimi created the whole database one of the fields was set as integer. However, as data is entered Aimi realises that the field should have been set to two decimal places.

Describe the steps that need to be taken, by Aimi, to change the field from an integer to a decimal. This field will be set to two decimal places.

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(c) Aimi created a relational database but could have created a flat file database.

Discuss the advantages and disadvantages of using a relational database rather than a flat file database.

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7. Nov/2021/Paper_11/No.7

A new database system has been set up for a bookshop. Part of a record from the database system is shown. Each field has a validation check which needs to be tested.

(a) For each field identify the most appropriate validation check. Each check must be different. The validation checks for two fields have already been identified; these types of validation check must not be used for the other fields.

Field name	Data	Validation check
ISBN	9781471837951	
Name_of_book	A View of the Castle	*Presence check*
Purchase_price	16.99	*Range check*
Year_published	2018	
Date_acquired	31/01/2019	

[3]

(b) The Purchase_price field uses a range check. The prices of books range from 1 to 100.

Identify **three** items of test data which could be used with the Purchase_price field, giving reasons for your choice. The reasons must be different in each case.

Item 1 .....

Reason .....

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Item 2 .....

Reason .....

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Item 3 .....

Reason .....

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[6]

8. Nov/2020/Paper_11/No.10a,b

A student is creating a database for her geography project to show all the earthquakes that occurred in 2019. She has produced part of the database which is shown.

	Country	Magnitude	Depth(km)	
	Vanuatu	6.9	26	
	Vanuatu	6.7	24	
	Indonesia	6.1	29	
	Vanuatu	6.7	27.6	
	Nepal	4.1	10.2	
	Myanmar	6.9	136	
	Japan	6.2	9	
	Japan	6	8	
	Vanuatu	6.4	16	
	Japan	7	10	
	Ecuador	7.8	20.6	
	South Georgia	6.2	14	
	Ecuador	6.2	14	
	Ecuador	6	10	
	Mexico	6	16	
	Mexico	6	10	
	Vanuatu	7	24	

When she has completed her database, she needs to carry out some searches on the data. To search for all the earthquakes with a depth of more than 20 km she will need to type the following search criteria.

Depth(km) >20

(a) Write the search criteria to find all the earthquakes of a magnitude greater than or equal to 6.5, with a depth less than 15 km.

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(b) Give the name of the country that satisfies the search criteria in part **(a)**.

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9. Mar/2020/Paper_12/No.9

A headteacher plans to use a computer database to keep records of the members of staff that teach in her school. She must choose between using a flat file database or a relational database.

(a) Explain the differences between a flat file database and a relational database.

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(b) The school keeps details of the teachers in one file and the subjects they teach in another file. A teacher teaches more than one subject.
Describe the steps the headteacher would need to take to create a relational database from this data.

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10. June/2020/Paper_12/No.1

The 2020 Olympic Games committee is producing a database to show the medal winners in the cycling events.

It is important that the correct data type is used in each of the fields.

(a) Tick (✓) the most appropriate data type for each of the following fields.

	Boolean (✓)	**Numeric (✓)**	**Text (alphanumeric) (✓)**
Athlete_name			
Gold_medal (Y/N)			
Age			
Name_of_country			

[4]

(b) A report has been produced that shows the male gold medal winners from the past three Olympic Games.

Write down **six** of the formatting features that have been used in the report.

Press Release: Mountain Bike competitions

The gold medalists for the 2008 to 2016 games in the Mountain Bike competitions are:

2008 Julien Absalon

Julian is a French rider who won at the Laoshan Mountain Bike course in Beijing, China. In 2012 he abandoned the race but came 8th in 2016.

2012 Jaroslav Kulhavý

Jaroslav is a member of the Czech Republic team who won at Hadleigh Farm, UK.

2016 Nino Schurter

Nino is from Switzerland. He won the Rio Mountain Bike competition in 34.617 mins at the Deodoro cycling base.

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11. June/2020/Paper_13/No.6a

The secretary of the Tawara Rowing Club is organising a presentation evening for its members. A systems analyst is creating a database for the club to store the details of the members. She is also creating a spreadsheet to show who is attending the presentation evening.

The systems analyst has set up the following fields for the database.

Name_of_person	Date_of_birth	Membership_type	Contact_email	Contact_phone_no	Year_joined	Gender
Nor Kwa	2/4/2005	Social	n.kwa@rockict.com	03 2453 5673	2018	F
Adam Mazian	23/5/2003	Social	AdamM@abc.co.my	082 25 4689	2016	M
Ahmed Othman	12/03/2006	Junior	AOthman@cie.org	01223 432678	2018	M
Zara Png	1/12/1997	Senior	Zara@cbc.cn	123 3267 9999	2010	F

(a) For the following fields write down the most appropriate data type. Each data type must be different. For any numeric field, specify the type of number.

Gender.....

Membership_type.....

Year_joined.....

[3]