

# THE UNIVERSITY OF AUCKLAND

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**FIRST SEMESTER, 2017**  
**Campus: City**

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## COMPUTER SCIENCE

### An Introduction to Practical Computing

**(Time Allowed: TWO hours)**

**NOTE:**

You must answer **all** questions in this exam.

Calculators are NOT permitted.

Answer Section A (Multiple choice questions) on the Teleform answer sheet provided.

Answer Section B in the space provided in this booklet.

There is space at the back for answers that overflow the allotted space.

<b>Surname</b>	
<b>Forename(s)</b>	<i>Sample Answers</i>
<b>Student ID</b>	<i>(Version 00000001)</i>
<b>Login (UPI)</b>	

	Question	Mark	Out Of
1 - 50	Multiple Choice		75
51	Programming using Python		12
52	Databases		13
	<b>TOTAL</b>		<b>100</b>

**SECTION A****MULTIPLE CHOICE QUESTIONS**

Each question in this section is worth **1.5 marks**. There is only **one** correct answer for each question. For each question, choose the **best** answer according to the information presented in lectures. Select your preferred answer on the Teleform answer sheet provided by shading in the appropriate box.

**Question 1**

[1.5 marks] Performance of hardware components is measured in different ways. Which of the following hardware components is measured in Hertz?

- (a) Motherboard.
- (b) HDD.
- (c) SSD.
- (d) CPU.**
- (e) Laser Printer.

**Question 2**

[1.5 marks] Which of the following statements is FALSE?

- (a) The CPU contains transistors.
- (b) The capacity of the motherboard is measured in FLOPS.**
- (c) The capacity of RAM is measured in bytes.
- (d) The CPU and RAM plug into the motherboard.
- (e) The CPU follows instructions and performs calculations.

**Question 3**

[1.5 marks] Given a machine that uses 6 dials that have 2 different states, how many different numbers can we represent?

- (a) 10
- (b) 12
- (c) 32
- (d) 50
- (e) 64**

**Question 4**

[1.5 marks] What decimal number is equivalent to the binary number 1010?

- (a) 8
- (b) 20
- (c) 40
- (d) 10**
- (e) 11

**Question 5**

[1.5 marks] Which of the following is considered as system software?

- (a) Mac OS X.
- (b) Chrome Browser.
- (c) Adobe Acrobat.
- (d) Microsoft Word.
- (e) GIMP.

**Question 6**

[1.5 marks] Which of the following statements is TRUE?

- (a) Freeware can be modified legally.
- (b) Proprietary software is never free.
- (c) The owners of proprietary software retain the legal rights to that software.
- (d) Freeware is always open-source software.
- (e) None of the above.

**Question 7**

[1.5 marks] Why is the Internet more robust than traditional telephone networks?

- (a) If a node of the Internet is broken, then other nodes will be used instead.
- (b) Traditional telephone networks cannot transfer data in real time, but the Internet can.
- (c) The Internet supports circuit switching, which is more reliable.
- (d) The Internet is centralized, so it is harder to bring down all the nodes.
- (e) Traditional telephone networks divide messages into packets, which can get lost.

**Question 8**

[1.5 marks] Which one of the following is NOT a function of TCP/IP?

- (a) Ensures that missing packets will be sent to the destination computer.
- (b) Routes packets from the source computer to the destination computer.
- (c) Uniquely identifies a computer on the Internet.
- (d) Creates hyperlinks so that users can navigate and browse websites.
- (e) Regulates the flow of packets over the Internet.

**Question 9**

[1.5 marks] Tom often checks his email on different devices including his desktop, laptop, mobile phone, and his tablet. He needs to be able to access the same emails on all his devices. Which protocol for email retrieval should Tom use to access his emails?

- (a) SMTP
- (b) DNS
- (c) IMAP
- (d) POP3
- (e) UDP

**Question 10**

[1.5 marks] Which of the following statements about instant messaging chat systems is FALSE?

- (a) Instant messaging is a form of asynchronous communication.
- (b) Instant messaging can be used to see if friends are online.
- (c) Some instant messaging apps offer end-to-end encryption for conversations.
- (d) Clients can chat to each other without passing through the server.
- (e) Many people can chat with each other at the same time.

**Question 11**

[1.5 marks] Which of the following would be the output in the Stage I Wiki for the following wiki markup?

```
'''I attend the UOA.'''
```

- (a) I ATTEND THE UOA.
- (b) I attend the UOA.
- (c) *I attend the UOA.*
- (d) **I attend the UOA.**
- (e) *I attend the UOA.*

**Question 12**

[1.5 marks] Which of these statements about Wikipedia is FALSE?

- (a) Most pages in Wikipedia can be edited by anyone.
- (b) Wikipedia runs on the MediaWiki software platform.
- (c) Wikipedia has automated and manual mechanisms for addressing vandalism.
- (d) Wikipedia is the world's biggest wiki.
- (e) Information on Wikipedia is provided by a group of selected experts.

**Question 13**

[1.5 marks] What does HTTPS stand for?

- (a) Hyper Threading Transitional Port Safe.
- (b) Hypertext Transfer Protocol Secure.
- (c) Host Thread Transport Protocol Secure.
- (d) Hypertext Transfer Protocol Safe.
- (e) Hyper Threading Transitional Port Secure.

**Question 14**

[1.5 marks] Programs that follow links from webpages and gather information from those webpages in order to create entries for a search engine index are known as:

- (a) Ants.
- (b) Viruses.
- (c) Spiders.
- (d) Worms.
- (e) Bees.

**Question 15**

[1.5 marks] Which of the following statements is FALSE?

- (a) Blocking software uses lists of IP addresses to determine which websites can be accessed and which websites should be blocked.
- (b) Publications classified as objectionable in New Zealand can be legally sold to non-minors in New Zealand.
- (c) Information on the Internet that is legal to view in one country might be illegal to view in another country.
- (d) Censorship laws are broken by viewing illegal material or viewing legal material illegally (by young people).
- (e) Filtering software stops access to websites based on content.

**Question 16**

[1.5 marks] Malware that runs in the background, monitoring the user's activities and sending the info back to the operator is known as:

- (a) A virus.
- (b) A logic bomb.
- (c) A worm.
- (d) A Trojan.
- (e) Spyware.

**Question 17**

[1.5 marks] What word is represented by the ASCII code "82 85 78"?

- (a) RUT
- (b) RAN
- (c) TAN
- (d) RUN
- (e) SUN

**Question 18**

[1.5 marks] ASCII is a 7-bit encoding. How many characters can it represent?

- (a) 26
- (b) 64
- (c) 128
- (d) 256
- (e) 52

**Question 19**

[1.5 marks] What would the output of the following LaTeX code be?

```
\textbf{This is a \textit{weird} question}
```

- (a) ***This is a weird question***
- (b) This is a weird question
- (c) `textbfThis is a textitweird question`
- (d) **This** is a *weird* question
- (e) **This is a weird question**

**Question 20**

[1.5 marks] Which LaTeX command inserts a title after the compilation of a LaTeX document?

- (a) `\title`
- (b) `\maketitle`
- (c) `\make{title}`
- (d) `<title>`
- (e) `\begin{title}`

**Question 21**

[1.5 marks] Which LaTeX symbol signifies a space that cannot be broken?

- (a) `\%`
- (b) `\br`
- (c) `~`
- (d) `--`
- (e) `\\`

**Question 22**

[1.5 marks] Who were the main developers of the Tex-LaTeX language?

- (a) Gates and Jobs.
- (b) Rudkin and Austin.
- (c) Shimori and Mufoni.
- (d) Knuth and Lamport.**
- (e) Scharhtein and Szeliski.

**Question 23**

[1.5 marks] What would the output of the following LaTeX code be?

```
\begin{enumerate}
\item Apple
\setcounter{enumi}{0}
\item Pen
\setcounter{enumi}{2}
\item Apple-pen
\end{enumerate}
```

- (a) 1. Apple  
2. Pen  
3. Apple-pen
- (b) 0. Apple  
0. Pen  
2. Apple-pen
- (c) 1. Apple  
1. Pen  
3. Apple-pen**
- (d) 1. Apple  
0. Pen  
2. Apple-pen
- (e) 0. Apple  
0. Pen  
3. Apple-pen

**Question 24**

[1.5 marks] What does the acronym HTML stand for?

- (a) Hypertext Mark-up Language.
- (b) Hyperlink Tentative Machine Language.
- (c) High Text Machine Learning.
- (d) Hypertext Machine Language.
- (e) High Tool Machine Language.

**Question 25**

[1.5 marks] What is the HTML tag for inserting an image with “description” as alternative text?

- (a) `<a href="filename">my image</a>`
- (b) `<a href="filename" my image>`
- (c) ` alt="description"</img>`
- (d) `<a src="filename" alt="description"/a>`
- (e) ``

**Question 26**

[1.5 marks] What does the acronym CSS stand for?

- (a) Computer Style Sheets.
- (b) Concurrent Style Sheets.
- (c) Cascading Style Syntax.
- (d) Cascading Style Sheets.
- (e) Computer Syntax Sheets.

**Question 27**

[1.5 marks] Which of the following statements best describes the genre of platform games?

- (a) It primarily involves 2D or 3D navigation through environments.
- (b) It is first-player combat oriented using ranged weapons.
- (c) It focuses on 2D or 3D close combat with another player.
- (d) It emulates real-world sports.
- (e) It focuses on the outcome of combat determined by skilful thinking and planning.



**Question 28**

[1.5 marks] Which of the following statements best describes the subscription game's business model?

- (a) The game is free but requires the player to subscribe to the weekly newsletter via email account creation.
- (b) It is a purchased game for full access to its features where further monetary outlay is unnecessary.
- (c) The core game is free and needs payment to purchase difficult to obtain in-game items.
- (d) It is a purchased game for full access to its features where further monetary outlay may be requested to purchase difficult to obtain in-game items.
- (e) It is a "pay to play" model where playing requires paying a subscription fee and may require an initial purchase.

**Question 29**

[1.5 marks] In HTML5, which set of essential tags contains all the content that will appear on the page?

- (a) <main>...</main>
- (b) <h1>...</h1>
- (c) <content>...</content>
- (d) <body>...</body>
- (e) <page>...</page>

**Question 30**

[1.5 marks] In HTML5, which of the following correctly specifies the formatting of tags which come in pairs?

- (a) <tag>...<\tag>
- (b) <tag>...</tag>
- (c) <tag ... \tag>
- (d) <tag ... /tag>
- (e) \begin{tag}... \end{tag}

**Question 31**

[1.5 marks] Consider the following HTML5 code fragment:

```
<table>
<tr><td>Two Rows</td><td></td><td>Two Columns</td></tr>
</table>
```

Which one of the following statements best describes the above HTML5 code?

- (a) This code has errors and will not generate a table.
- (b) It creates a table with one row and two columns.
- (c) It creates a table with two rows and three columns.
- (d) It creates a table with two rows and two columns.
- (e) It creates a table with one row and three columns.

**Question 32**

[1.5 marks] In HTML5, which one of the following specifies the correct combination of essential tags for producing lists?

- (a) <ul><dl></dl></ul>
- (b) <ol><li></li></ol>
- (c) <ul><dt></dt></ul>
- (d) <dl><li></li></dl>
- (e) <ul><li><\li><\ul>

**Question 33**

[1.5 marks] Consider the following style definition:

```
<style type="text/css">
.quote { text-align: center; font-style:italic }
</style>
```

Considering CSS standards, which one of the following will create a paragraph content where the text is centred and in italic font?

- (a) <p class="quote">test</p>
- (b) <p="quote">test</p>
- (c) <p><i>test</i></p>
- (d) <p align="center"><it>test</it></p>
- (e) <p="quote"><i>test</i></p>

**Question 34**

[1.5 marks] Consider the following style definition:

```
<style type="text/css">
.position { text-align: right; }
#location { text-align: center; }
</style>
```

Considering CSS standards, which one of the following corresponds to a correct class selector call for a paragraph style?

- (a) `<p class="location"> Test </p>`
- (b) `<p id="position"> Test </p>`
- (c) `<p style="position"> Test </p>`
- (d) `<p class="position"> Test </p>`**
- (e) `<p id="location"> Test </p>`

**Question 35**

[1.5 marks] Consider the following CSS style definition for border colour:

```
border-color: #bf0af3;
```

Which of the following statements about the border's colour information is TRUE?

- (a) The provided colour (green) is coded as ggrrbb in hexadecimal.
- (b) The provided colour (purple) is coded as rgb in vigesimal (base 20).
- (c) The provided colour (magenta) is coded as rrggbb in hexadecimal.**
- (d) The provided colour (brown) is coded as rrggbb in octal.
- (e) The provided colour (green) is coded as rgbycm (red-green-blue-yellow-cyan-magenta) in hexadecimal.

**Question 36**

[1.5 marks] In which decade were both Microsoft and Apple founded?

- (a) 1950s.
- (b) 1970s.**
- (c) 1980s.
- (d) 1990s.
- (e) 1960s.

**Question 37**

[1.5 marks] Which of the following statements concerning good presentation design is FALSE?

- (a) Keep a consistent background throughout the presentation.
- (b) Use a colour background contrasting well with the content.
- (c) Use black text on a white background.
- (d) Using colour for decoration is distracting and annoying.
- (e) Use a complex background to keep the reader focussed.

**Question 38**

[1.5 marks] Following CSS standards, what is the definition and usage of the <link> tag?

- (a) The <link> tag is used to link a document to an image.
- (b) The <link> tag is used to group block-elements to format them with CSS.
- (c) The <link> tag defines references between a document and its tables (if any).
- (d) The <link> tag is used to link a document to external style sheets.
- (e) The <link> tag defines a hyperlink, which is used to link from one page to another.

**Note:** The following HTML5 code fragment is to be used for Question 39:

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
  <title>A nice table</title>
  <style type="text/css">
    .position {border-style: dotted;}
  </style>
</head>
<body>
<table border="5px", class="position">
  <tr>
    <td>Thursday</td> <td>Sunny</td>
  </tr>
  <tr>
    <td>Friday</td> <td>Cloudy</td>
  </tr>
  <tr>
    <td>Saturday</td> <td>Rain</td>
  </tr>
</table>
</body>
</html>
```

**Question 39**

[1.5 marks] Which of the following tables represents the one created by the above code?

(a) 

Thursday	Sunny
Friday	Cloudy
Saturday	Rain

(b) 

Thursday	Sunny
Friday	Cloudy
Saturday	Rain

(c) 

Thursday	Sunny
Friday	Cloudy
Saturday	Rain

(d) 

Thursday	Sunny
Friday	Cloudy
Saturday	Rain

(e) 

Thursday	Sunny	Friday
Cloudy	Saturday	Rain

**Question 40**

[1.5 marks] Who is Paul Allen?

- (a) The co-founder of Apple.
- (b) The co-founder of Microsoft.
- (c) The creator of the Super Mario game franchise.
- (d) The founder of Intel.
- (e) The co-founder of IBM.

**Question 41**

[1.5 marks] Which one of the following statements is TRUE?

- (a) Pixel-based images are more scalable than vector-based images.
- (b) Given an option, it is always better to work with pixel-based images.
- (c) Given an option, it is always better to work with vector-based images.
- (d) Rasterization is the process through which a vector-based image is transformed into an array of pixels.
- (e) Rasterization is the process through which a pixel-based image is transformed into a vector-based image.

**Question 42**

[1.5 marks] Which one of the following statements is FALSE?

- (a) Reducing the number of colours used in an image is a form of lossy compression.
- (b) Storing a 10 x 10, two-colour pixel-based image always requires 100 bits (or more).
- (c) Decreasing colour depth can decrease the file size of an image.
- (d) Run-length encoding takes advantage of regions in images that are similar.
- (e) Reducing the resolution of an image is a form of lossy compression.

**Question 43**

[1.5 marks] Which of the following formulas could be entered into Cell C3 of an Excel spreadsheet, so that when the formula is filled down, each filled down cell displays the product of the cell immediately to the left of it multiplied by Cell A1?

- I =B3\*A\$1
- II =B3\*\$A\$1
- III =B3\*\$A1

- (a) III only.
- (b) II only.
- (c) I only.
- (d) I and II.
- (e) None of the above.

**Question 44**

[1.5 marks] How many cells are in the range D10:E15?

- (a) 6
- (b) 12**
- (c) 15
- (d) 10
- (e) 5

**Question 45**

[1.5 marks] Cell A2 in a spreadsheet contains the final marks for a student. Which one of the following formulas can be placed in Cell B2 so that it will display "PASS" if that final mark is greater than or equal to 60, and "FAIL" otherwise?

- (a) =IF (B2 , A2 >= 60 , "FAIL" , "PASS" )
- (b) =IF (A2 <= 60 , "PASS" , "FAIL" )
- (c) =IF (A2 <= 60 , "FAIL" , "PASS" )
- (d) =IF (A2 >= 60 , "PASS" , "FAIL" )**
- (e) =IF (B2 , A2 <= 60 , "PASS" , "FAIL" )

**Question 46**

[1.5 marks] Which of the following is NOT a function in Microsoft Excel?

- (a) MIN
- (b) SUM
- (c) REFERENCE**
- (d) MAX
- (e) AVERAGE

**Question 47**

[1.5 marks] The goal(s) of Artificial Intelligence is to ...

- I create artificial systems that are as intelligent (or more intelligent) than people.
- II improve our understanding of the intelligence of animals and people.
- III better understand philosophical concepts of cognition, intelligence and consciousness.

- (a) I, II and III.**
- (b) I and II only.
- (c) II only.
- (d) I only.
- (e) III only.

**Question 48**

[1.5 marks] Given the table in Cells **B3:C7** of the spreadsheet below, which of the following formulas can be placed in **Cell D10** and filled down to Cells D11 and D12, so that each cell in Column D of Rows 10 – 12 displays the name of the athlete with the number immediately to the left of those cells? With the correct formula, D10 should show "Kimiko", D11 should show "Georges", etc.

	A	B	C	D
1				
2		<b>Athlete's Number</b>	<b>Athlete's Name</b>	
3		11	Afua	
4		28	Tian	
5		44	Kimiko	
6		64	Georges	
7		74	Abena	
8				
9		<b>Race 1 Results</b>	<b>Number</b>	<b>Name</b>
10		First place	44	
11		Second place	64	
12		Third place	11	
13				

- (a) =VLOOKUP (C10, B3 : C7, 2, TRUE)
- (b) =HLOOKUP (C10, \$B\$3 : \$C\$7, 1, FALSE)
- (c) =HLOOKUP (C10, \$B\$3 : \$C\$7, 2, FALSE)
- (d) =VLOOKUP (C10, \$B\$3 : \$C\$7, 2, FALSE)**
- (e) =VLOOKUP (C10, B3 : C7, 1, TRUE)

**Question 49**

[1.5 marks] Which of the following Boolean expressions evaluates in Microsoft Excel to FALSE?

- (a) =5>10**
- (b) =5==5
- (c) =TRUE
- (d) =10<=10
- (e) =10>=10

**Question 50**

[1.5 marks] For a machine to pass the Turing test ...

- (a) a person must correctly conclude that a particular person is not a machine.
- (b) a person must be unable to tell the machine and person apart.**
- (c) a machine must correctly identify another machine as being a machine (and not a person).
- (d) a machine must correctly identify a person as being a person (and not a machine).
- (e) None of the above.



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QUESTION/ANSWER BOOKLET FOLLOWS

## SECTION B

Answer all questions in this section in the space provided. If you run out of space, please use the Overflow Sheet and indicate in the allotted space that you have used the Overflow Sheet.

### 51. Programming Using Python (12 marks)

(a) What is the output of the following program?

```
x = 5
y = 10
z = 0

print("x y z")

while x <= y:
    print(x, y, z)
    x = x * 2
    y = y + 5
    z = y
    if z > 15:
        z = z * 2
```

```
x y z
5 10 0
10 15 15
20 20 40
```

(3 marks)

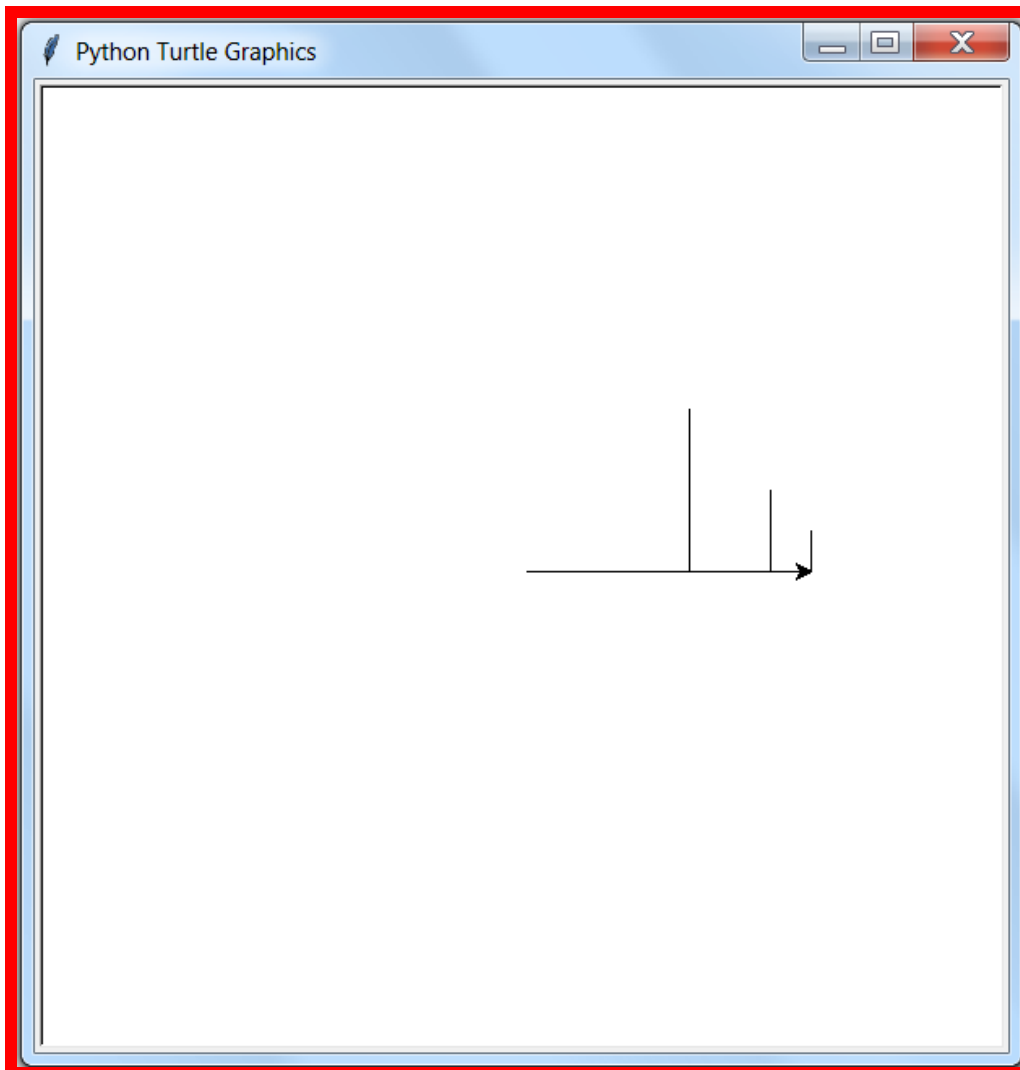
(b) Using the space provided below, draw the output produced by the Python ‘turtle’ program below. Assume that the turtle begins in the middle of the window facing right and that the window is approximately 600 steps wide.

**Make sure to clearly indicate:**

- the path drawn by the turtle.
- the final position and direction of the turtle (using the arrowhead).

```
import turtle

step = 100
while step >= 25:
    turtle.forward(step)
    turtle.left(90)
    turtle.forward(step)
    turtle.backward(step)
    turtle.right(90)
    step = step/2
```



(3 marks)

(c) In the space below, write a Python program that:

- asks the user for a number **N**
- asks the user for a character
- prints the character **N** times in a row as in the example below.

**Note:** To get full marks for this question, your answer must not use any loops.

The following **example** shows the exact formatting expected for the prompts and output.

*Example:*

```
Enter a whole number: 5
Enter a character: a
aaaaa
```

```
n = int(input("Enter a whole number: "))
character = input("Enter a character: ")
print(character * n)
```

(2 marks)

- (d) In the space below, write a Python program that prompts the user for a whole number. It then prints out all of the numbers between 1 and 20 (inclusive) that are not divisible by the number that the user entered.

The following **example** shows the exact formatting expected for the prompts and output.

*Example:*

```
Enter a whole number: 2
1
3
5
7
9
11
13
15
17
19
```

```
divisor = int(input("Enter a whole number: "))
number = 1
while number <= 20:
    if number % divisor != 0:
        print(number)
    number = number + 1
```

(4 marks)

**52. Databases (13 marks)**

A database that contains information on the nutrition of various fruit includes the table shown below. Refer to this table when answering Parts (a), (b) and (c) of this question.

ID	Fruit	Calories	Fat	Sodium	Cholesterol
1	Banana	89	300	1	0
2	Apple	52	200	1	0
3	Orange	47	100	0	0
4	Pineapple	50	100	1	0

(a) Fill in the Query by Example (QBE) grid below so that it lists the names of the **Fruit** and their **Fat** quantity, when the number of **Calories** is greater than or equal to 50.

Field:	Fruit	Fat	Calories	
Table:	Fruit	Fruit	Fruit	
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Criteria:			>=50	
or:				

(3 marks)

(b) In the space below, draw the correct output of the query described above.

Fruit	Fat
Banana	300
Apple	200
Pineapple	100

(2 marks)

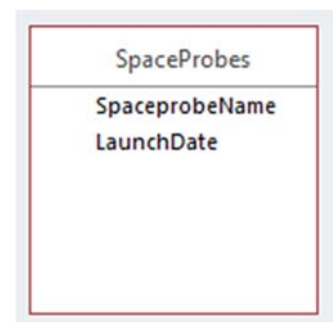
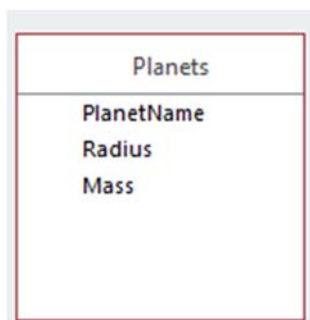
- (c) In the space below, write a SQL Query that lists the names of all fruit in the database with more than 0 sodium. The list should be ordered by the number of calories from lowest to highest. The output should look like this:

Fruit
Pineapple
Apple
Banana

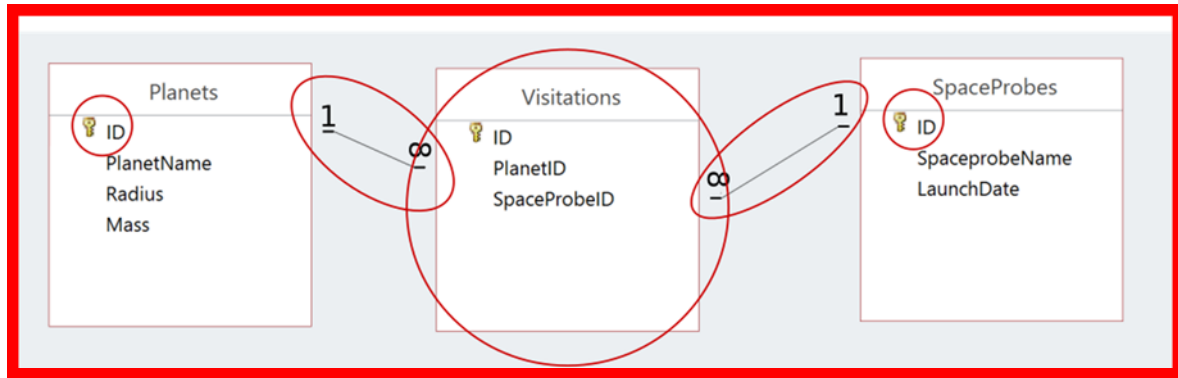
```
SELECT Fruit  
FROM Fruit  
WHERE Sodium > 0  
ORDER BY Calories;
```

(4 marks)

- (d) Below is an incomplete database relationship diagram. Amend the diagram so that it can store information about which planets have been visited by which space probes. Each planet can be visited by zero, one or more space probes, and each space probe can visit one or more planets. To make this amendment you may need to add one or more of any of the following: tables, fields, primary key indicators and/or relationship lines.



(4 marks)





**- Overflow Sheet -**

**Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.**

**Rough Working – This page will not be marked**

**Rough Working – This page will not be marked**