

Sample Questions

Course Title: **XXXXXXXXXX**
16XXXXXX

Examples of Command Taxonomy

SAM P1, Q08b, 2 marks

- (b) Explain why a person attempting to gain unauthorised access to a networked computer can sometimes benefit the owner of the network.

(2)

Question number	Answer	Additional guidance	Mark
8(b)	<p>An explanation that makes reference to any one from:</p> <ul style="list-style-type: none"> • security vulnerabilities in the network are exposed (1) by someone who is paid/rewarded to do it/ethical hacker (1) • identify problems/flaws with the network (1) so that vulnerability can be addressed (1) • security vulnerabilities are exposed and addressed (1) before being made public (1). 		(2)

SAM P2, Q01c(ii), 3 marks

(ii) Open the file **Q01c** in the code editor.

Amend the code to correct three program errors.

Save your amended code as **Q01cFINISHED** with the correct file extension for the programming language.

(3)

Question number	Answer	Additional guidance	Mark
1(c)(ii)	<p>Python</p> <ul style="list-style-type: none"> Total is undefined/need to add initialisation for variable total (1). Equals symbol in If statement needs to be replaced with '==' (1). Print ("Odd") needs to be indented (1). <pre> 1 myNumbers = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100] 2 total = 0 3 for theNumber in myNumbers: 4 total = total + theNumber 5 if(theNumber % 2 == 0): 6 print("Even") 7 else: 8 print("Odd") 9 print(total) </pre>	<p>Candidates are required to open the file Q01c in the code editor. Amended code SHOULD be saved as Q01cFINISHED.</p> <p>Do not penalise logic errors such as initialising total inside loop.</p>	(3)
	<p>Java</p> <ul style="list-style-type: none"> Total is undefined/need to add initialisation for variable total (1). Equals symbol in If statement needs to be replaced with '==' (1). Missing closed } after Print ("Odd") (1). <pre> 5 int total = 0; 6 for (int i=10;i<=100;i+=10) 7 { 8 total = total + i; 9 if(i % 2 == 0) 10 System.out.println("Even"); 11 else 12 { 13 System.out.println("Odd"); 14 } 15 } 16 System.out.println(total); </pre>		
	<p>C#</p> <ul style="list-style-type: none"> Total is undefined/need to add initialisation for variable total (1). Equals symbol in If statement needs to be replaced with '==' (1). Missing End If after Console.WriteLine ("Odd") (1). <pre> int total = 0; for (int i = 10; i <= 100; i += 10) { total = total + i; if (i % 2 == 0) Console.WriteLine("Even"); else { Console.WriteLine("Odd"); } } Console.WriteLine(total); Console.ReadKey(); </pre>		

Mark Scheme Explanation

SAM P1, Q05b(iii), 3 marks

(iii) The questionnaire asks for the number of smartphones a student can access.

One student enters -38 (negative) in error.

Convert -38 to two's complement. Use 8-bit binary. Show your working.

(3)

Question number	Answer	Additional guidance	Mark
5(b)(iii)	38 To bin: 0010 0110 (1) Flip bits: 1101 1001 (1) Add 1: 0000 0001 -38: 1101 1010 (1) Alternative solution (Subtraction from 2^n where $n=8$ bits) Formula: $2^n - 38$ Substitution: $2^8 - 38$ (1) Calculation: $256 - 38 = 218$ (1) To binary: 1101 1010 (1)	Correct answer only gains 3 marks.	(3)



SAM P2, Q02a, 10 marks

2 A football club uses computer applications.

(a) The club collects this data about visitors:

- country of origin
- number of adults and children in each party.

This pseudocode contains the logic required to do this.

```
6  # Print prompt and take country from user
7  SEND "Enter the country you're visiting from: " TO DISPLAY
8  RECEIVE country FROM (STRING) KEYBOARD
9
10 # Tell the user their country
11 SEND ("You are from: " & country) TO DISPLAY
12
13 # Take number of adults in party
14 SEND "Enter the number of adults in your party: " TO DISPLAY
15 RECEIVE adults FROM (INTEGER) KEYBOARD
16
17 # Take number of children in party
18 SEND "Enter the number of children in your party: " TO DISPLAY
19 RECEIVE children FROM (INTEGER) KEYBOARD
20
21 # Calculate total number in party
22 SET total TO adults + children
23
24 # Tell user the total
25 SEND ("The total in your party is: " & total)
26
```

Write a program to implement the logic in the pseudocode.

Do not add any further functionality.

You **must** use the structure given in file **Q02a** to write the program.

Save your amended code as **Q02aFINISHED** with the correct file extension for the programming language.

(10)

Q02a – Python

```
1 # Print prompt and take country from user
2
3 # Tell the user their country
4
5 # Take number of adults in party from user
6
7 # Take number of children in party from user
8
9 # Calculate total number in party
10
11 # Tell the user the total number of people in their party
12
```

Q02a – C#

```
1 using System;
2 namespace Q02a
3 {
4     class Q02a
5     {
6         static void Main(String[] args)
7         {
8             // Print prompt and take country from user
9
10            // Tell the user their country
11
12            // Take number of adults in party from user
13
14            // Take number of children in party from user
15
16            // Calculate total number in party
17
18            // Tell the user the total number of people in their party
19
20        }
21    }
22 }
```



Q02a – Java

```
1 import java.util.Scanner;
2 public class Q02a
3 {
4     public static void main (String[] args)
5     {
6
7         // Print prompt and take country from user
8
9         // Tell the user their country
10
11        // Take number of adults in party from user
12
13        // Take number of children in party from user
14
15        // Calculate total number in party
16
17        // Tell the user the total number of people in their party
18
19    }
20 }
```

Question number	Answer	Additional guidance	Mark
2(a)	<p>Award 1 mark for each of:</p> <ul style="list-style-type: none"> attempting to input country and print country (1) printing string plus country (1) attempting to input number of children and number of adults (1) coercion of at least one data type (1) attempting to calculate and print a total (1) calculating a total using the addition operator (1) using two variables (1) printing a string plus an integer (1) compiling without syntax errors (1) executing and producing the correct output (1). 	<p>Candidates are required to open the file Q02a in the code editor. Amended code should be saved as Q02aFINISHED.</p> <p>Logic of algorithm must be followed as set out. Alternatives must address each point.</p> <p>Do not penalise candidates who attempt more than the stated requirements.</p>	



Python

```
5 # Print prompt and take country from user
6 country = input ("Enter the country you're visiting from: ")
7
8 # Tell the user their country
9 print ("You are from: ", country)
10
11 # Take number of adults in party from user
12 adult = int (input ("Enter the number of adults in your party: "))
13
14 # Take number of children in party from user
15 children = int (input ("Enter the number of children in your party: "))
16
17 # Calculate total number in party
18 total = adult + children
19
20 # Tell the user the total number of people in their party
21 print ("The total in your party is: ", total)
```

C#

```
8 // Print prompt and take country from user
9 Console.WriteLine("Enter the country you are visiting from: ");
10 String country = Console.ReadLine();
11 Console.WriteLine("You are from: " + country);
12
13 // Tell the user their country
14 Console.WriteLine("Enter the number of adults in your party: ");
15
16 // Take number of adults in party from user
17 int adults = Convert.ToInt32(Console.ReadLine());
18 Console.WriteLine("Enter the number of children in your party: ");
19
20 // Take number of children in party from user
21 int children = Convert.ToInt32(Console.ReadLine());
22
23 // Calculate total number in party
24 int total = adults + children;
25
26 // Tell the user the total number of people in their party
27 Console.WriteLine("The total in your party is: " + total);
28
```

Java

```
6 Scanner input = new Scanner(System.in);
7
8 // Print prompt and take country from user
9 System.out.print("Enter the country you are visiting from: ");
10 String country = input.next();
11
12 // Tell the user their country
13 System.out.println("You are from: " + country);
14
15 // Take number of adults in party from user
16 System.out.print("Enter the number of adults in your party: ");
17 int adults = input.nextInt();
18
19 // Take number of children in party from user
20 System.out.print("Enter the number of children in your party: ");
21 int children = input.nextInt();
22
23 // Calculate total number in party
24 int total = adults + children;
25
26 // Tell the user the total number of people in their party
27 System.out.println("The total in your party is: " + total);
28
```

SAM P1, Q03a, 6 marks

- 3** A team of researchers are studying urban wildlife, such as foxes, mice, and birds. The team collect data during the day and night. Sometimes, they work in an office.

(a) The team:

- use a range of hardware, including laptops, tablets, and smartphones
- use different operating systems and applications
- communicate with each other using smartphones or tablets
- store and share data, including images, audio recordings and videos
- work collaboratively on research documents.

Identify the secondary storage medium most suitable for the team and justify why it best meets their needs.

Write your answer on the next page. You do not need to use all of the space.

(6)

Answer to question 3(a)



Question number	Answer	Mark
3(a)	<p>Indicative content</p> <p>Cloud storage is most suitable.</p> <p>Accessibility:</p> <ul style="list-style-type: none"> it is accessible whenever and wherever an internet connection is available the team's devices probably support mobile data, then they will always have access to their documents can work with data locally (offline) and upload/re-synchronise documents. <p>Collaboration:</p> <ul style="list-style-type: none"> the team can work on documents at the same time, which is good for multiple field workers entering/reading data at the same time. <p>File compatibility:</p> <ul style="list-style-type: none"> applications can be used online instead of having native ones on each device that way, there is no conversion of file types necessary. <p>Online apps:</p> <ul style="list-style-type: none"> the online applications can be used to edit online stored data files there may be cost savings by using online applications instead of buying individual ones for each of the devices. <p>Backups:</p> <ul style="list-style-type: none"> documents on the cloud will be backed up without the user having to think about it. 	(6)

Level	Mark	Descriptor
	0	No rewardable content.
Level 1	1–2	<p>Basic, independent points are made, showing elements of knowledge and understanding of key concepts/principles of computer science.</p> <p>The discussion will contain information with little linkage between points made.</p>
Level 2	3–4	<p>Demonstrates adequate knowledge and understanding of key concepts/principles of computer science.</p> <p>The discussion shows some linkages and lines of reasoning, with some structure.</p>
Level 3	5–6	<p>Demonstrates comprehensive knowledge and understanding by selecting relevant knowledge and understanding of key concepts/principles of computer science to support the discussion being presented.</p> <p>The discussion shows a well-developed, sustained line of reasoning that is clear, coherent and logically structured.</p>



Pearson

Sample questions

May 2019 Paper 1 Principles of Computer Science

Sample Questions

May 2019 P1, Q01d, 2 marks

(d) Some computers use virtual memory.

Explain how virtual memory works.

(2)

Question Number	Answer	Additional Guidance	Mark
1(d)	<p>Any two from:</p> <ol style="list-style-type: none"> 1. Virtual memory (VM) is used when RAM becomes full (1) (to hold all programs and data). 2. Virtual memory is used as (an extension to) main memory/RAM / works like RAM. (1) 3. Virtual memory is stored/created on (internal) secondary storage/HDD/SSD. (1) 4. Virtual memory is used as temporary storage. (1) 5. Instructions and data not currently being used are transferred from RAM to VM/HDD. (1) 6. When needed again, instructions and data are transferred back to RAM. (1) 		2



2019, P1, Q01d (Script 1)

Virtual memory works like RAM but instead of using actual components it uses pre-existing memory like a hard drive or SSD

2019, P1, Q01d (Script 2)

When the RAM is full, then the currently used applications are stored in virtual memory, ~~and~~ which is slower to fetch.



May 2019 P1, Q04d, 4 marks

(d) A text file is stored on a hard disc.

The file holds information from one side of a sheet of paper.

The sheet of paper is represented as a grid, 80 columns wide and 66 rows long.

Each cell in the grid contains a single 2-byte Unicode character.

The file also contains 40 characters of metadata.

The hard disc allocates space in blocks of 1024 bytes.

Construct an expression to show the number of blocks required to store the file.

You do **not** need to do the calculation.

(4)



Question Number	Answer	Additional Guidance	Mark
4(d)	<p>Award 4 marks for 11 Award 3 marks for a value between 10 and 11</p> <p>One mark for each:</p> <ul style="list-style-type: none">• $80 \times 66 \times 2$ or $80 \times 66 \times 16 \div 8$ (1)• $+ 40$ or $+ 80$ (1)• $\div 1024$ (1)• Ceiling or RoundUp (1)	<ul style="list-style-type: none">• Arithmetic precedence rules must be clearly followed• Units are not required• Alternative notations for ceiling are accepted• If 16 bits per Unicode character is not awarded, then allow follow through error• Allow follow through error, if interim calculations attempted• Equivalent expressions are accepted	4



May 2019, P1, Q04d (Script 1)

(4)

$$\cancel{2 \times 80 \times 66 \times 40}$$
$$\cancel{(2 \times 80 \times 66)} \times 40 = \text{amount of bytes}$$
$$\frac{\text{amount of bytes}}{1024} = \text{number of blocks (rounded up)}$$

e.g. $1.2 = 2$ as it's in blocks of 1024

May 2019, P1, Q04d (Script2)

$$\begin{array}{r} 80 \times 66 \\ \hline \times 2 \text{ bytes} \\ \hline \times 40 \text{ characters} \\ \hline 1024 \end{array} = \text{Blocks}$$

May 2019 P1, Q03c, 3 marks

(c) Isra uses her tablet computer and smartphone to access email.

She wants to set up a new email account.

State the email protocol she should use.

Justify your choice.

(3)

Email protocol

Justification



Question Number	Answer	Additional Guidance	Mark
3(c)	<ul style="list-style-type: none">• IMAP (1) <p>AND one from:</p> <ul style="list-style-type: none">• because changes are synced (1) with the mail server in real-time (1)• because the messages always reside on the email server (1) as she has limited storage (1) on her tablet and phone• it gets sent to both smartphone and tablet (1) <p>Alternative answer:</p> <ul style="list-style-type: none">• POP3 (not awarded a mark) <p>AND one from:</p> <ul style="list-style-type: none">• because storage limitations on server (1) and privacy issues (1)• because more CPU time (1) may be used when syncing (1) (a large number of messages).		3



May 2019 P1, Q03c (Script 1)

Email protocol
IMAP
Justification
<u>IMAP only downloads the header of the email to</u> <u>local storage and only downloads the rest if they are being</u> <u>viewed, since she accesses her email from multiple devices</u> <u>she doesn't want one email to take up lots of storage of all of them</u>

May 2019 P1, Q03c (Script 2)

Email protocol
IMAP
Justification
<u>It gets sent to both smartphone and tablet computer</u> <u>and as she wants them to be linked IMAP is the better</u> <u>choices as it does this better than the other protocols.</u>

May 2019 P1, Q06c, 6 marks

(c) Artificial intelligence (AI), in many forms, has an increasing impact on our lives.

Discuss this statement considering characteristics, uses and ethical issues.

(6)



Question Number	Answer	Mark
6(c)	<p>Indicative content:</p> <p>Characteristics – Any of the following:</p> <ul style="list-style-type: none">• Implemented in software.• Could involve the use of neural networks / clustering / modelling• Algorithms are trained by exposure to data that has been validated / checked• Algorithms learn by identifying commonalities between the validated / checked data• Algorithms make predictions for new data based on prior learning• Algorithms may incorporate recursive self-improvement <p>Uses – Any of the following:</p> <ul style="list-style-type: none">• Game playing (opponents)• Analytics (analyse buying patterns, predicting behaviours, predictive text, targeted advertising, personalised news feeds, friend suggestions)• Image / Audio processing (recognising objects/patterns, face recognition)• Logistics (scheduling, order fulfilment)• Control systems (cars, manufacturing, weapons, navigation)• Diagnostic systems (medical, mechanical, electrical)• Natural languages processing (chatterbots, chatbots, speech recognition, personal assistants)• Robotics (dangerous situations, help aged or disabled) <p>Ethical issues – Any of the following:</p> <ul style="list-style-type: none">• Training sets could include data that should not be used to make decisions (race, religion, gender, etc.) that could cause biased outcomes• Is a computer to be trusted to make decisions (life-death)?• If a computer discovers something that humans can't prove, should it be accepted as truth?• How do we know that the answer produced is correct?• Will people be comfortable interacting with machines that are considered intelligent?• Some jobs may be at risk, especially those requiring human skills such as empathy or creativity.	6



May 2019 P1, Q06c (Script 1)

Artificial intelligence has become more and more important for various technologies in recent years, and it seems AI will be a key part of our lives in the future. It is currently being used to develop financial monitors, ~~there~~ driverless cars, facial recognition software, and ~~and~~ much more. Artificial intelligence is when a program is capable of making human-like decisions. It is often used with machine ~~learning~~ learning so the system is able to improve itself. Its use in the development of driverless cars raises some ethical issues, such as when a crash is certain, how should a computer program get to decide who lives and dies. Artificial intelligence programs need to be given certain rules to follow to ensure the safety of the people working with them, and they cannot be connected to the internet as this would be dangerous. In the future, it is very possible AI will replace humans for various jobs which could also be a problem as it would lead to mass unemployment. Most people now interact with artificial ~~intelligence~~ intelligence on a daily basis as it is present in many forms of software such as search engines, and social media networks as well as other things. There are also different levels of artificial intelligence, and we are currently only beginning to discover what it is capable of. There is a type of AI called ASI or artificial super intelligence which is able to improve itself. It would be dangerous to create ASI without a carefully planned and selected set of rules for it to follow.

(Total for Question 6 = 15 marks)



May 2019 P1, Q06c (Script 2)

AIs are very common in the modern day as most people have one like Siri, on their phone or an Alexa at home. They tend to be very helpful and usually relatively fast and aid us in simple chores like setting times or calling someone. ~~Beac~~ They are especially useful as they can respond to voice, allowing others to do multiple things at the same time. Many people find them to be useful due to this, however some also have doubts. ~~Due~~ Due to them being able to respond to your voice, they must always be listening which allows some people to believe that AIs are a ^{way} ~~form~~ ~~the~~ for the government to monitor a person's every day life. This has caused some ~~disagreement~~ problems about whether AIs are ethically okay as they can be ~~so~~ considered an invasion of privacy if someone does not want to be heard. Of course, this is up to those who buy them. Due to AIs also being extremely intelligent and self-sufficient, some ^{people} ~~believe~~ fear them.

(Total for Question 6 = 15 marks)



Pearson

Sample questions

June 2019 Paper 2 – Application of Computational Thinking

Sample Questions

June 2019 P2, Q01c, 3 marks

(c) Open **Q01c** in the code editor.

The program should print out a counter and the counter with 7 added to it.

There are **three** errors in the code.

Amend the code to correct the errors.

Save your amended code as **Q01cFINISHED** with the correct file extension for the programming language.

(3)

```
1 # Q01c
2
3 count = 0
4
5 maxValue = 5
6
7 while (count < maxValue)
8     print(count, Count + constantValue)
9     count = count + 1
```

Question	Answer	Additional Guidance	Mark
1(c)	<p>C#</p> <ol style="list-style-type: none"> Semicolon at the end of line 9 [maxValue=5;] (1) Consistent capitalisation of 'count' on lines 10, 11, 13 and 14 (1) constantValue needs to be defined and given the value 7 / replaced by value 7 (1) <p>Java</p> <ol style="list-style-type: none"> Semicolon at the end of line 8 [maxValue = 5;] (1) Consistent capitalisation of 'count' on lines 7, 9, 11 and 12 (1) constantValue needs to be defined and given the value 7 / replaced by 7 (1) <p>Python</p> <ol style="list-style-type: none"> Colon needed at end of line 7 [count, maxValue:] (1) Consistent capitalisation of 'count' on line 3, 7, 8 and 9 (1) constantValue needs to be defined and given the value 7 / replaced by 7 (1) 	<p>Candidates are required to open the file Q01c in the code editor.</p> <p>Amended code should be saved as Q01cFINISHED.</p> <p>Line numbers may have been changed by corrections to code (e.g. insertion of constantValue definition)</p>	(3)

```
1 # Q01c
2
3 count = 0
4
5 maxValue = 5
6 constantValue = 7
7
8 while (count < maxValue):
9     print(count, count + constantValue)
10    count = count + 1
11
```



June 2019 P2, Q01c (Script)

```
3 count = 0
4
5 maxValue = 7
6
7 while (count < maxValue):
8     print("count", Count + constantValue)
9     count = count + 1
```

June 2019 P2, Q01f, 4 marks

(f) Trevor is the manager of a shoe shop.

Sales assistants can earn a bonus based on the numbers of pairs of shoes they sell and the total income for the shop each day.

Open **Q01f** in the code editor.

Amend the code to complete the 'if statement' used to produce the outputs described in the table.

Condition	Output
Shop income is more than £5000 or sales assistant has sold at least 10 pairs of shoes	Bonus is 10% of salary
Shop income is £2000 or more and sales assistant has sold at least 5 pairs of shoes	Bonus is 5% of salary

Do not add any further functionality.

Save your amended code as **Q01fFINISHED** with the correct file extension for the programming language.

(4)

```

1 # Q01f
2
3 list_1f =[(2010,8), (4800, 11), (2011,4), (5000,9)]
4 assistantSalary = 1000.00
5
6 for pair in list_1f:
7     shopIncome = pair[0]
8     assistantSales = pair[1]
9     print ("Shop income :", shopIncome, "Assistant sales ", assistantSales)
10
11     if ( ):
12         print ("Assistant bonus = ", assistantSalary * 0.1)
13
14     elif ( ):
15         print("Assistant bonus = ", assistantSalary * 0.05)
16
17     else:
18         print("Assistant bonus = ", 0)

```



Question	Answer	Additional Guidance	Mark						
1(f)	<p>Award 1 mark for each correct pair of relational operators and 1 mark for correct Boolean operator for each condition.</p> <table><tr><th>Condition</th><th>Coding</th></tr><tr><td>Shop income more than £5000 or assistant sold at least 10 pairs</td><td>shopIncome > 5000; assistantSales >= 10 (1) correct OR operator (1)</td></tr><tr><td>Shop income at least £2000 and assistant sold at least 5 pairs</td><td>shopIncome >= 2000; assistantSales >= 5 (1) correct AND operator (1)</td></tr></table> <p>Accept >9, >1999 and >4 for respective >= comparisons</p>	Condition	Coding	Shop income more than £5000 or assistant sold at least 10 pairs	shopIncome > 5000; assistantSales >= 10 (1) correct OR operator (1)	Shop income at least £2000 and assistant sold at least 5 pairs	shopIncome >= 2000; assistantSales >= 5 (1) correct AND operator (1)	<p>Candidates are required to open the file Q01f in the code editor. Amended code should be saved as Q01fFINISHED.</p> <p>Do not penalise candidates who attempt more than the stated requirements.</p> <p>Do not award Boolean operator mark for single or & as these are not correct.</p>	(4)
Condition	Coding								
Shop income more than £5000 or assistant sold at least 10 pairs	shopIncome > 5000; assistantSales >= 10 (1) correct OR operator (1)								
Shop income at least £2000 and assistant sold at least 5 pairs	shopIncome >= 2000; assistantSales >= 5 (1) correct AND operator (1)								

```
11 if (shopIncome > 5000) or (assistantSales >= 10):
12     print ("Assistant bonus = ", assistantSalary * 0.1)
13
14 elif (shopIncome >= 2000) and (assistantSales >= 5):
15     print("Assistant bonus = ", assistantSalary * 0.05)
```



June 2019 P2, Q01f (Script)

```
3 list_1f = [(2010,8), (4800, 11), (2011,4), (5000,9)]
4 assistantSalary = 1000.00
5
6 for pair in list_1f:
7     shopIncome = pair[0]
8     assistantSales = pair[1]
9     print ("Shop income :", shopIncome, "Assistant sales ", assistantSales)
10
11     if (shopIncome > 5000 or assistantSales ==10):
12         print ("Assistant bonus = ", assistantSalary * 0.1)
13
14     elif (shopIncome >= 2000 and assistantSales ==5):
15         print("Assistant bonus = ", assistantSalary * 0.05)
16
17     else:
18         print("Assistant bonus = ", 0)
```

June 2019 P2, Q02a, 10 marks

2 Anna has a 5-year-old daughter, Beatrice, and a 14-year-old son, Graham.

(a) Anna wants to program a guessing game for Beatrice to play on the computer.

The program will generate a random number between 1 and 10.

Beatrice has to guess the number.

This pseudocode contains the logic required to create the game.

```
1  #   Initialise variables
2      SET counter TO 1
3      SET answer TO RANDOM(9) + 1    # i.e. a random integer 1 to 10 inclusive
4      SET guess TO 0
5
6  #   Print prompt and take guess from user
7      SEND "Enter a number from 1 to 10: " TO DISPLAY
8      RECEIVE guess FROM (INTEGER) KEYBOARD
9
10 #   Create while loop to check guess
11     WHILE guess <> answer DO
12         SET counter TO counter + 1
13         IF guess > answer THEN
14             SEND (guess & " was too high. Try again.") TO DISPLAY
15         ELSE
16             SEND (guess & " was too low. Try again.") TO DISPLAY
17         END IF
18         SEND "Guess again: " TO DISPLAY
19         RECEIVE guess FROM (INTEGER) KEYBOARD
20     END WHILE
21
22 #   Report the correct answer to the user and display the number of guesses
23     SEND ("You guessed " & guess & " in " & counter & "guesses.") TO DISPLAY
```

Write a program to implement the logic in the pseudocode.

Open **Q02a** in the code editor.

You **must** use the structure give in **Q02a** to write the program.

Do not add any further functionality.

Save your code as **Q02aFINISHED** with the correct file extension for the programming language.

(10)

```

1 # Q02a
2
3 from random import *
4
5 # Initialise variables
6
7
8
9 # Print prompt and take guess from user
10
11
12
13 # Create WHILE loop to check if guess is correct
14
15
16
17 # Report the correct answer to the user and indicate the number of guesses

```

Question	Answer	Additional Guidance	Mark
2(a)	<p>Award 1 mark for each of:</p> <ol style="list-style-type: none"> 1. set counter to 1 and guess to 0 (1) 2. set answer to random value between 1 and 10 (1) 3. request input of and accept an integer value for guess (1) 4. create a while loop with a correct condition (1) 5. increment the counter (1) 6. use if else selection to determine and display appropriate output message for incorrect guesses (1) 7. request input of and accept another integer value for a guess inside the loop (1) 8. display correct guess and count of guesses (1) 9. compiling without syntax errors (1) 10. coding meets all requirements of question (1) 	<p>Candidates are required to open the file Q02a in the code editor.</p> <p>Amended code should be saved as Q02aFINISHED.</p> <p>Logic of algorithm must be followed as set out.</p> <p>Alternatives must address each point.</p> <p>Do not penalise candidates who attempt more than the stated requirements.</p>	(10)



```
5  # Initialise variables
6  counter = 1
7  answer = randint(1,10)
8  guess = 0
9
10 # Print prompt and take guess from user
11 guess = int(input("Enter a number from 1 to 10: "))
12
13 # Create while loop to check answer
14 while guess!=answer:
15     counter = counter + 1
16     if(guess > answer):
17         print (guess, " was too high. Try again.")
18     else:
19         print (guess, " was too low. Try again.")
20
21     guess = int(input("Guess again: "))
22
23 # Report the correct answer to the user and indicate the number of guesses
24 print ("You guessed", guess, "in", counter, "guesses")
25
```



June 2019 P2, Q02a (Script)

```
3 from random import *
4
5 # Initialise variables
6 counter=1
7 answer=random.int(1,10)
8 guess=0
9
10
11 # Print prompt and take guess from user
12 number=int(input("Enter a number from 1 to 10: "))
13
14
15 # Create WHILE loop to check if guess is correct
16 while guess<>answer:
17     counter=counter+1
18     if guess>answer:
19         print(guess," was too high. Try again")
20     else:
21         print(guess," was too low. Try again")
22 guess2=int(input("Guess again: "))
23
24
25 # Report the correct answer to the user and indicate the number of guesses
26 print("You guessed",guess,"in",counter,"guesses.")
27
```

June 2019 P2, Q03a, 6 marks

3 Different algorithms can be used to manipulate data.

(a) **Email.txt** contains a list of email addresses.

Open **Q03a** in the code editor.

Write a program to implement these requirements.

The code must:

- check each email address to ensure it contains the '@' symbol.
- write email addresses that do not contain the '@' symbol to an **Error.txt** file.

You must use the structure given in the file **Q03a** to complete the program.

Do not add further functionality.

Save your code as **Q03aFINISHED** with the correct file extension for the programming language.

(6)

```

1  # Q03a
2
3  #   Open the file and input data
4
5
6  #   Open output file
7
8
9  #   Find errors and write to output file
10
11
12 #   Close files

```

Question	Answer	Additional Guidance	Mark
Q3(a)	Award 1 mark each for: <ol style="list-style-type: none"> 1. File opened for input (1) 2. File opened for output (1) 3. Loop for processing data (1) 4. Check for '@' symbol (1) 5. Write invalid address to output file (1) 6. Close files (1) 	Amended code should be saved as Q03aFINISHED. Do not penalise candidates who attempt more than the stated requirements.	(6)



```
1 Q03aFINISHED
2
3 # Open file and input data
4 with open('Email.txt','r') as inputFile:
5     emailList = inputFile.readlines()
6
7 # Open file for output
8 outputFile = open('Error.txt', 'a')
9
10 # Find errors and write to error log
11 for address in emailList:
12     if not "@" in address:
13         outputFile.write(address)
14
15 # Close files
16 outputFile.close()
17 inputFile.close()
18
```



June 2019 P2, Q03a (Script)

```
1 # Q03a
2 #   Open the file and input data
3 in_file = open("Email.txt", "r")
4
5 line = in_file.readline()
6
7 errors = []
8
9 #   Open output file
10 out_file = open("Error.txt", "w")
11
12 #   Find errors and write to output file
13
14 while(line):
15     line = in_file.readline()
16     if ("@" not in line):
17         errors.append(line)
18
19 for element in errors:
20     out_file.write(element)
21
22 #   Close files
23 in_file.close()
24 out_file.close()
```

June 2019 P2, Q03c, 6 marks

(c) Open **Q03c** in the code editor.

Write a program to display the square and cube of a number between 1 and 50 entered by a user.

The code must:

- ask the user to enter a number between 1 and 50 inclusive
- display the number, the square of the number and the cube of the number, with appropriate labels
- stop when a number outside the range 1 to 50 is entered.

Save your code as **Q03cFINISHED** with the correct file extension for the programming language.

(6)

```
1 # Q03c
2
3 # Write your code below this line
4
```

Question	Answer	Additional Guidance	Mark
Q3(c)	<p>Award 1 mark for each section of code that:</p> <ol style="list-style-type: none"> Asks for input of a number and stores it in a variable with a meaningful name (1) Checks number is between 1 and 50 (1) Calculates square and cube of number (1) Displays suitable labels e.g. 'Number', 'Square' and 'Cube' and relevant values (1) <p>For the whole code:</p> <ol style="list-style-type: none"> Compiles and runs without logical or syntax errors (1) Efficient in terms of computation, storage and selection of programming constructs (1) 	<p>Amended code should be saved as Q03cFINISHED.</p> <p>Allow follow through for mark point 4 when square and cube are incorrectly calculated.</p> <p>Credit alternative coding which produces same results.</p> <p>Accept use of exponent operators:</p> <p>C# e.g. Math.Pow (2, 3) = 8</p> <p>Java e.g. Math.pow (2, 3) = 8</p> <p>Python e.g. 2**3 = 8.</p>	(6)

```
1 # Q03c
2
3 # Write your code below this line
4 myValue = 1
5
6 while (myValue >= 1 and myValue <= 50):
7     myValue = int(input("Enter a value from 1 to 50: "))
8     if (myValue >= 1 and myValue <= 50):
9         print("Value: ", myValue, "Square: ", myValue*myValue, "Cube: ", myValue*myValue*
10             myValue)
11         print("Value: ", myValue, "Square: ", myValue**2, "Cube: ", myValue**3)
```

Note: Line 11 is an alternative response to line 9.



June 2019 P2, Q03c (Script)

```
1 # Q03c
2
3 # Write your code below this line
4 number=int(input("Please enter a number from 1 to 50: "))
5 if number>=1 and <=50:
6     print("You entered the number: ",number)
7     print("Square of ",number," = ",number**2)
8     print("Cube of",number," = ",number**3)
9 elif number<1:
10     print("Invalid input, your number is not on our range as it falls too low")
11 elif number>50:
12     print("Invalid input, your number is not on our range as it is too high")
13 else:
14     print("Error")
15
```

June 2019 P2, Q05, 20 marks

5 Ria is a school librarian.

She wants a program to analyse pupil use of the library.

She wants to encourage reading by awarding gold, silver and bronze medals to the three pupils who have read the most books.

Test data has been included in the code.

Open **Q05** in the code editor.

Write a program to calculate and display:

- the total number and average number of books pupils have read
- the IDs of pupils who have read fewer than ten books
- the details of the gold, silver and bronze medal winners.

Your program should function correctly even if the number of pupils in the file is changed.

Save your code as **Q05FINISHED** with the correct file extension for the programming language.

(20)

```
3 libraryRecord = [  
4 ["105MS" , "Marcus" , "Smith" , 25 ],  
5 ["103AZ" , "Anthony" , "Zarrent" , 5 ],  
6 ["108MW" , "Matt" , "White" , 12 ],  
7 ["112DB" , "Denise" , "Bilton" , 58 ],  
8 ["124MK" , "Malcolm" , "Kelly" , 26 ],  
9 ["116UK" , "Uzere" , "Kevill" , 29 ],  
10 ["127AL" , "Abduraheim" , "Leahy" , 94 ],  
11 ["124LS" , "Laura" , "Sampras" , 50 ],  
12 ["121AP" , "Azra" , "Potter" , 61 ],  
13 ["115AC" , "Anthony" , "Calik" , 10 ],  
14 ["117PI" , "Pablo" , "Iilyas" , 49 ],  
15 ["113MM" , "Mark" , "Montgomerie" , 68 ],  
16 ["130FH" , "Felicity" , "Heath" , 11 ],  
17 ["132JA" , "Jill" , "Alexander" , 61 ],  
18 ["123SG" , "Sara" , "Grimstow" , 9 ],  
19 ["134KD" , "Kevin" , "Dawson" , 74 ],  
20 ["122AB" , "Andrew" , "Bertwistle" , 42 ],  
21 ["125JF" , "Jaide" , "Feehily" , 55 ],  
22 ["128JS" , "Justin" , "Slater" , 68 ],  
23 ["126CG" , "Colleen" , "Grohl" , 39 ]  
24 ]  
25 # -----  
26 # Write your code below this line
```




Question	Designated marks:	Additional Guidance	Mark
Q5	<p>Designated marks:</p> <ol style="list-style-type: none">1. Initialise variables for at least two of total number of books, count of pupils and average2. Initialise variables for gold, silver and bronze / sort array in order of books read3. Create loop for identifying (and printing) those borrowing fewer than 10 books4. Print out appropriate details (must include pupil ID)5. Print out total of books borrowed6. Print out average number of books borrowed7. Identification of gold medal winner8. Identification of silver medal winner9. Identification of bronze medal winner10. Details of at least one of gold, silver and bronze medal winner printed (minimum last name or first name)11. Details of all three medal winners (first name and last name)	<p>Award marks independently</p> <p>Award marks for reasonable attempt to meet requirement.</p>	(11)



Question 5 Overview marks:				
Mark Band 0	Mark Band 1	Mark Band 2	Mark Band 3	Marks
0	1 – 3	4 – 6	7 – 9	
No rewardable content	<p>Little attempt to decompose the problem into component parts</p> <p>Some parts of the logic are clear and appropriate to the problem</p> <p>Some appropriate use and manipulation of data types, variables, data structures and program constructs</p> <p>Parts of the code are clear and readable</p> <p>Finished program will not be flexible enough with other data sets or input</p> <p>The program meets some of the given requirements</p>	<p>Some attempt to decompose the problem into component parts</p> <p>Most parts of the logic are clear and mostly appropriate to the problem</p> <p>The use and manipulation of data types, variables and data structures and program constructs is mostly appropriate</p> <p>Code is mostly clear and readable</p> <p>Finished program will function with some but not all other data sets or input</p> <p>The program meets most of the given requirements</p>	<p>The problem has been decomposed into component parts</p> <p>The logic is clear and appropriate to the problem</p> <p>The use and manipulation of data types, variables and data structures and program constructs is appropriate</p> <p>Code is clear and readable</p> <p>Finished program could be used with other data sets or input</p> <p>The program fully meets the given requirements</p>	(9)



```
26 # Write your code below this line
27
28 total = 0
29 gold = 0
30 silver = 0
31 bronze = 0
32 goldID = 0
33 silverID = 0
34 bronzeID = 0
35
36 print ("Pupil ID of pupils who have read less than 10 books ")
37
38 for row in range(len(libraryRecord)):
39     books = int(libraryRecord[row][3])
40     if (books > gold):
41         bronze = silver
42         silver = gold
43         gold = books
44         goldID = row
45     elif (books > silver):
46         bronze = silver
47         silver = books
48         silverID = row
49     elif (books > bronze):
50         bronze = books
51         bronzeID = row
52
53     total = total + books
54
55     if (books < 10):
56         print ("\t",libraryRecord[row][0])
57
58 print ("\n")
59 print ("Total number of books read by pupils: " , total)
60
61 print ("\n")
62 print ("Average number of books read by pupils: " , total / len(libraryRecord[0]))
63
64 print ("\n")
65 print ("Gold medal winner is: \t\t", libraryRecord[goldID][1], " ", libraryRecord[goldID][2])
66 print ("Silver medal winner is: \t", libraryRecord[silverID][1], " ", libraryRecord[silverID][2])
67 print ("Bronze medal winner is: \t", libraryRecord[bronzeID][1], " ", libraryRecord[bronzeID][2])
```



```
30 int total = 0;
31 double average;
32 int books[] = new int[libraryRecord.length];
33 int gold = 0, silver = 0, bronze = 0;
34 int goldID = 0, silverID = 0, bronzeID = 0;
35
36 System.out.println("Pupil ID of pupils who have read less than 10 books");
37
38 for (int i = 0; i < libraryRecord.length; i++)
39 {
40     books[i] = Integer.parseInt(libraryRecord[i][3]);
41     if (books[i] > gold)
42     {
43         bronze = silver; silver = gold; gold = books[i]; goldID = i;
44     }
45     else if (books[i] > silver)
46     {
47         bronze = silver; silver = books[i]; silverID = i;
48     }
49     else if (books[i] > bronze)
50     {
51         bronze = books[i]; bronzeID = i;
52     }
53     total = total + books[i];
54
55     if (books[i] < 10)
56     {
57         System.out.println(libraryRecord[i][0]);
58     }
59 }
60 System.out.println();
61
62 System.out.println("Total books read by pupils = " + total);
63
64 System.out.println();
65
66 average = total / libraryRecord.length;
67
68 System.out.println("Average books read by pupils = " + average);
69
70 System.out.println();
71
72 System.out.println("Gold winner is " + libraryRecord[goldID][1] + " " + libraryRecord[goldID][2]);
73 System.out.println("Silver winner is " + libraryRecord[silverID][1] + " " + libraryRecord[silverID][2]);
74 System.out.println("Bronze winner is " + libraryRecord[bronzeID][1] + " " + libraryRecord[bronzeID][2]);
```



```
36 int total = 0;
37 double average = 0;
38 int[] books = new int[libraryRecord.GetLength(0)];
39 int gold = 0, silver = 0, bronze = 0;
40 int goldID = 0, silverID = 0, bronzeID = 0;
41
42 Console.WriteLine("Pupil ID of pupils who have read less than 10 books");
43
44 for (int i = 0; i < libraryRecord.GetLength(0); i++)
45 {
46     books[i] = Convert.ToInt16(libraryRecord[i, 3]);
47     if (books[i] > gold)
48     {
49         bronze = silver; silver = gold; gold = books[i]; goldID = i;
50     }
51     else if (books[i] > silver)
52     {
53         bronze = silver; silver = books[i]; silverID = i;
54     }
55     else if (books[i] > bronze)
56     {
57         bronze = books[i]; bronzeID = i;
58     }
59     total = total + books[i];
60
61     if (books[i] < 10)
62     {
63         Console.WriteLine(libraryRecord[i, 0]);
64     }
65 }
66 Console.WriteLine();
67 Console.WriteLine("Total books read by pupils = " + total);
68
69 Console.WriteLine();
70 average = total / libraryRecord.GetLength(0);
71
72 Console.WriteLine("Average books read by pupils = " + average);
73 Console.WriteLine();
74
75 Console.WriteLine("Gold winner is " + libraryRecord[goldID, 1] + " " + libraryRecord[goldID, 2]);
76 Console.WriteLine("Silver winner is " + libraryRecord[silverID, 1] + " " + libraryRecord[silverID, 2]);
77 Console.WriteLine("Bronze winner is " + libraryRecord[bronzeID, 1] + " " + libraryRecord[bronzeID, 2]);
78
79 Console.ReadLine();
```



June 2019 P2, Q05 (Script 1)

```
27 totalBooks = 0
28 lowReaders = []
29 bookCount = 0
30 count = -1
31 goldMedal = []
32
33 for student in libraryRecord:
34     if student[3] < 10:
35         lowReaders.append(student[0])
36     totalBooks = totalBooks + student[3]
37     if student[3] > bookCount:
38         bookCount = student[3]
39         count = count + 1
40
41 if bookCount in student:
42     goldMedal.append(student)
43 avgRead = totalBooks / len(libraryRecord)
44
45 print("The students have all collectively
46       read {} total books".format(totalBooks))
47 print("On average a student has
48       read {} books".format(int(avgRead)))
49 print("These are the IDs of the students whom
50       read less than 10 books {}".format(lowReaders))
```

The students have all collectively read 846 total books

On average a student has read 42 books

These are the IDs of the students whom read less than 10 books ['103AZ', '123SG']



June 2019 P2, Q05 (Script 2)

```
28 winners = [("", "", "", 0), ("", "", "", 0), ("", "", "", 0)]
29 read_fewer = []
30 books_read = 0
31 places = ["Gold: ", "Silver: ", "Bronze: "]
32
33 for pupil in libraryRecord:
34     if (len(pupil) != 4):
35         continue
36     books_read += pupil[3]
37     if(pupil[3] < 10):
38         read_fewer.append(pupil[0])
39     for i in range(3):
40         if(pupil[3] > winners[i][3]):
41             winners[i] = pupil
42             break
43
44 print("Books read: " + str(books_read) + " Average: " +
45       str(books_read/len(libraryRecord)))
46 print("Read fewer than ten: ")
47 for id in read_fewer:
48     print(id)
49
50 print("Winners: ")
51 for i in range(3):
52     print(places[i] + str(winners[i][1]) + " " +
53           str(winners[i][2]) + " has read " + str(winners[i][3]) +
54           " books. Library id: " + str(winners[i][0]))
```

```
Books read: 846 Average: 42.3
Read fewer than ten:
103AZ
123SG
Winners:
Gold: Abduraheim Leahy has read 94 books. Library id: 127AL
Silver: Kevin Dawson has read 74 books. Library id: 134KD
Bronze: Justin Slater has read 68 books. Library id: 128JS
```