

NAMIBIA SENIOR SECONDARY CERTIFICATE

COMPUTER STUDIES HIGHER LEVEL

8324/1

PAPER 1

3 hours

Marks 100

2019

Additional Material: Answer Book

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write your answers in the Answer Book provided.
- Write your Centre Number, Candidate Number and Name in the spaces on the Answer Book provided.
- Write in dark blue or black pen.
- Do not use correction fluid.

- Answer **all** questions.

- The number of marks is given in brackets [] at the end of each question or part question.
- The businesses mentioned in this question paper are entirely fictitious.

This document consists of **11** printed pages and **1** blank page.



Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

- 1 Sibungu wants to search for an item of data held in an array. He writes the following algorithm.

```

Line 1    SET list to [71,76,66,67,89,72]
Line 2    SET target to 71
Line 3    SET found to false
Line 4    FOR counter FROM 0 to 5 DO
Line 5          IF list[counter] = target THEN
Line 6                SET found to true
Line 7          ELSE
Line 8                SET found to false
LINE 9          END IF
LINE 10   ENDFOR
LINE 11   IF found = true THEN
LINE 12         SEND "Item found" TO DISPLAY
LINE 13   ELSE
LINE 14         SEND "Not found" TO DISPLAY
LINE 15   ENDIF

```

- (a) A trace table is shown which shows the line numbers where a variable has changed. State the missing values at A, B, C and D

| Line | list | target | counter | found |
|------|---------------------|--------|---------|-------|
| 1 | [71,76,66,67,89,72] | | | |
| 2 | | A | | |
| 3 | | | | B |
| 4 | | | 0 | |
| 5 | | | | C |
| 6 | | | | |
| 10 | | | 1 | |
| 8 | | | | D |

[4]

- (b) The algorithm is incorrect and so outputs the wrong message.

(i) Explain why the algorithm is incorrect.

[1]

(ii) Describe how to correct the algorithm.

[1]

- 2 Businesses and individuals are now making use of cloud services instead of local storage for storing their data.
- (a) State **two** benefits of using cloud-based storage instead of local storage. [2]
- (b) The owner of a business is concerned that the business data stored on the public cloud is not secure.
- Explain why this is not the case. [2]
- 3 A programmer is developing a stock control program for Mobitech Solutions, a cellphone retail business in Otjiwarongo. If a user enters a stock code number from 1 to 450, it will display the amount of those items in stock.
- (a) Give **one** example of the following types of test data the programmer could use to test the stock code number in the program. For each example, suggest whether it will be accepted or rejected.
- (i) Extreme data. [2]
- (ii) Abnormal data. [2]
- (b) A systems analyst has been asked to improve the company's order processing system. One stage in the process is design. Different types of diagrams can be used at this stage by the systems analyst.
- Besides a Gantt Chart, name **two** of these diagrams and describe its features. [3]

- 4 A Mathematics game is designed for primary school pupils to test number ordering. In the game the pupil is asked to enter two integer numbers. A third integer number is then randomly generated and shown to the pupil.

The pupil must then state if the random number is:

- lower (l) than the two entered numbers
- higher (h) than the two entered numbers
- in the middle (m) of the two entered numbers

A design for the code is shown below.

```

1 <enter the first number and assign to numOne>
2 <enter the second number and assign to numTwo>
3 <generate random number and assign to randNum>
4 SEND randNum TO DISPLAY
5 RECEIVE guess FROM (CHARACTER) KEYBOARD
6 IF guess = "l" AND randNum < numOne THEN
7 SEND "Correct it is lower" TO DISPLAY
8 SET score TO score + 1
9 ENDIF
10 IF guess = "m" AND randNum >= numOne AND randNum <= numTwo THEN
11 SEND "Correct it is in the middle" TO DISPLAY
12 SET score TO score + 1
13 ENDIF
14 IF guess = "h" AND randNum > numTwo THEN
15 SEND "Correct it is higher" TO DISPLAY
16 SET score TO score + 1
17 ENDIF
18 <display incorrect message>

```

When the two numbers are entered the program should ensure that numTwo is always a higher number than numOne.

Using pseudocode or a programming language of your choice, write several lines to represent the input and this validation for line 2.

[4]

- 5 An object-oriented language is used to create a class called Queue. The following line of code initialises a queue called FirstQ:

Queue FirstQ=new Queue()

The class definition includes the following methods.

| Method Name | Description |
|------------------|---|
| addtoback | Adds an object to the rear of the queue |
| remove | Removes an object from the front of the queue |
| isempty | Returns true if the queue is empty |

- (a) Other than methods, describe what else could be defined in a class. [2]
- (b) The class uses a 1-D array with six elements to hold the contents of the queue and the variables front and rear to hold the positions of the item at the front and rear of the queue.

Initial values for front = 0, rear = 2.

The following lines of code are executed:

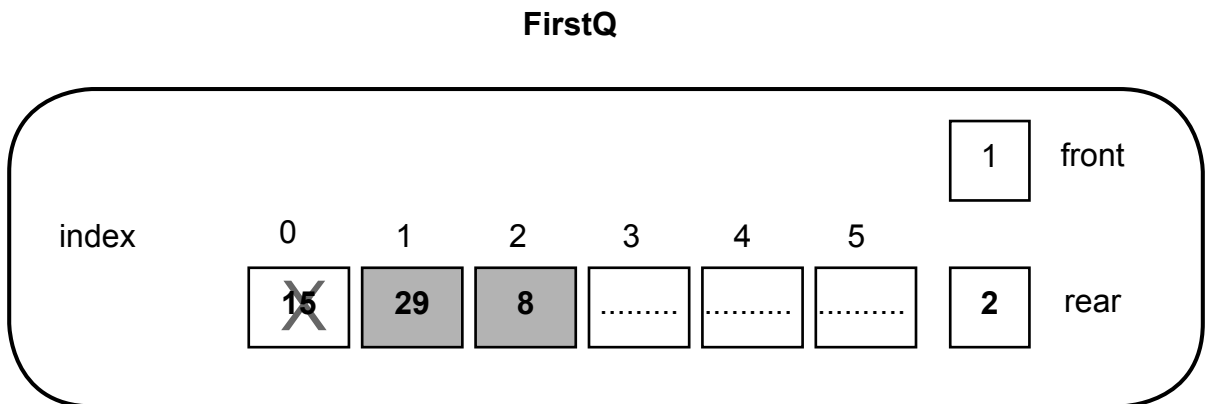
FirstQ.addtoback(15)

FirstQ.addtoback(29)

FirstQ.remove

FirstQ.addtoback(8)

The following diagram shows that 29 and 8 are in the queue. The number 15 is still present in the 1-D array but is not in the queue.



- (i) State what happens to the variables **front** and **rear** when a number is removed from the queue. [2]
- (ii) The state of FirstQ shown above is changed by executing these additional lines of code:

FirstQ.addtoback(11)

FirstQ.remove

FirstQ.addtoback(9)

Draw a diagram that shows the new state of FirstQ. [3]

- (c) (i) Describe the problem that will arise as items continue to be added and removed from FirstQ. [2]
- (ii) Describe how the problem in (c) (i) could be solved. [1]
- 6 (a) Distinguish between the Internet and the World Wide Web (www). [4]
- (b) Albertina is designing a website for a children's home that is located in Tsumeb. The colour code for a section of the homepage is hexadecimal FF4D4D. What is the binary representation for this hexadecimal code? Show all working for your answer. [2]
- (c) Give **two** reasons why programmers like Albertina prefer to use hexadecimal codes when programming instead of binary or denary equivalents? [2]
- 7 Job shadowing involves students learning on the job from an employee as the students explore potential career paths. Phemelo is an intern for a job shadowing activity. He is completing a project for submission to the Accounting department about the operations of a business.
- Explain how Phemelo could use the following software in office automation at this business. Give an example in each case.
- (a) spreadsheet [2]
- (b) information retrieval [2]
- 8 A private college in Windhoek advertises its courses.
- (a) Rather than advertising in a local newspaper, the college decides to produce a computer-based presentation. This presentation is to be shown in a local shopping mall.
- Describe **two** advantages in doing this rather than using the local newspaper. [2]
- (b) (i) Identify **two** electronic methods that the college could use to advertise its courses. [2]
- (ii) State **two** advantages of the method that you stated in (b) (i), over using the method mentioned in (a). [2]

- 9 Marathon runners from all regions in Namibia take part in marathon races.
- A runner must be registered with one club only and club names are unique.
 - A club has runners; each runner has a unique national Member ID.
 - Each race is organised by a club and the Club Secretary records which runners are entered for each race.
 - Runners may enter any race.
 - There is only one race on any one day.

At present, each club records the data for the competition races it organises. The data is stored in flat files.

- (a) State **two** advantages that a relational database would have over the use of flat files. [2]
- (b) A relational database is to be created from this flat file database.
- (i) What is the relationship between runner and race? [1]
- (ii) What is the relationship between club and race? [1]
- (c) Consider that some of the field names in this database table are Member ID, Club and Date (date of event).

Write down a query statement that would display all marathon runners' **Member ID's** only, from a Club called '**The Fredericks**' that are competing in an event that was held on **26/01/2019**. [3]

- 10 (a) Name the following type of bar code:



- [1]
- (b) At a research centre in Henties Bay, **ink jet printers** and **3D printers** are some of the types of printers used.
- State **one** suitable application for **each** printer mentioned above. A different application must be given for each printer. [2]
- (c) Name another type of printer and describe **one** way in which it is different from the printers named above. [2]
- (d) Modern Liquid Crystal Display (LCD) monitors use Light-Emitting Diode (LED) backlit technology.
- Give **two** reasons for using LED technology. [2]

11 (a) Gustav is setting up a network for a school.

Give **two** reasons why Gustav would choose a client/server network rather than a peer-to-peer network. [2]

(b) The school has both a wired and a wireless network. The wireless network allows portability of workstations.

(i) Describe **two** advantages of the wired network over the wireless network for the school. [2]

(ii) Describe **two** advantages of the wireless network compared to the wired network. [2]

12 Pseudocode for a short program is written to calculate the markup on products.

Part of the pseudocode is shown below.

....

Line 11 SET markupRate TO 0.3

Line 12 RECEIVE productCost FROM (REAL) KEYBOARD SET

Line 13 productMARKUP TO productCost * markupRate

(a) The program is tested but stops running after a few lines. An error is highlighted.

(i) Name the type of translator being used. Give a reason for your choice. [2]

(ii) State **one** disadvantage of using this type of translator. [1]

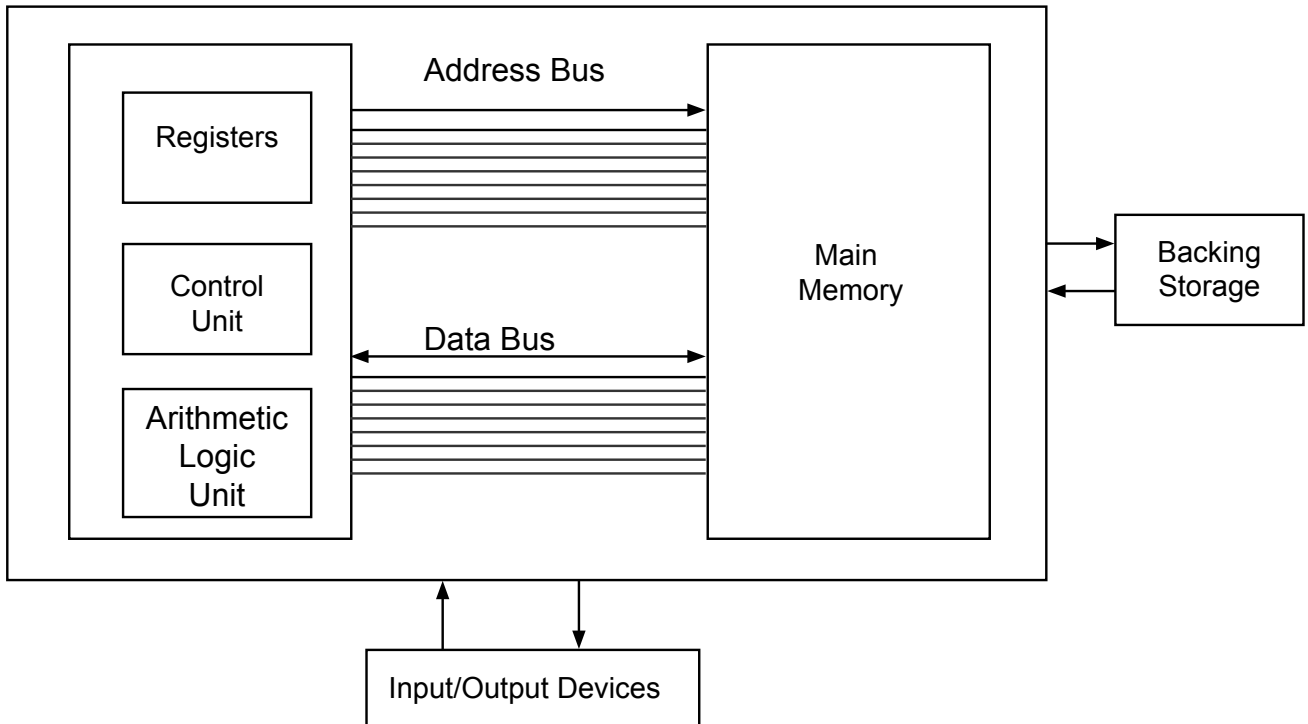
(b) When all errors are removed, the completed program is translated.

A section of the translated code is shown below.

| |
|----------|
| 10110001 |
| 00101110 |
| 11101010 |
| 01101110 |

State the type of programming language the code has been translated into. [1]

(c) A diagram of a computer system is shown.



The following part of the program is executed.

Line 12 RECEIVE productCost FROM (REAL) KEYBOARD SET

Name the part of the computer system that will carry out each of the following tasks during the execution of this line of code.

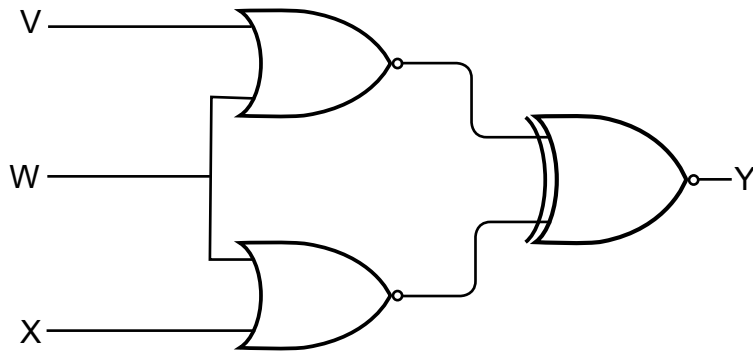
- (i) Carries the location of productCost in main memory. [1]
- (ii) Transfers the value of productCost from main memory to the processor. [1]
- (iii) Performs the productMARKUP calculation. [1]

- 13** A student loan facility is used to borrow money from a financial institution as a way of supporting university students. The financial institution has an expert system which:
- assists in deciding whether or not to grant a loan to a student.
 - advises on the most suitable type of loan for that student's needs.
- (a) State **one** reason why student loan lending is suitable for an expert system. [1]
- (b) Describe **two** components of an expert system. [4]
- (c) The expert system should have justification facilities. Justification facilities help answer How/Why questions.
- (i) State **two** ways in which justification can be used in a consultation. [2]
- (ii) Identify **one** benefit of including justification facilities in the student loan expert system. [1]
- 14** Parity checks are carried out on the data being transmitted around a computer network. The data below has arrived at its destination and a parity error has been found.

| Data before being sent | Data at destination |
|------------------------|---------------------|
| 1001 1000 | 1001 1001 |

- (a) What type of parity is being used here? Explain your answer. [2]
- (b) Other than parity checks, name **two** other methods that can be used to detect errors in data transmission. [2]
- (c) Joel's computer is infected with a virus that is activated within a general purpose package.
Describe how a checksum could be used to detect a virus. [2]

15 (a) Draw the truth table for the following logic circuit.



[4]

(b) Draw a logic circuit which corresponds to the following logic statement.

$$Z = ((\text{NOT } A \text{ AND } B) \text{ OR } (\text{NOT } B \text{ OR } C)) \text{ OR } (B \text{ AND } C)$$

[6]

BLANK PAGE

