

# **Computer Science 2210/22 Guess Paper, 2019**

**Questions and Answers  
By: Zafar Ali Khan, ZAK**



**O/A Levels Computer Science**  
by: Zafar Ali Khan | [www.zakathon.com](http://www.zakathon.com) | +923-111-222-ZAK (925)



### Section A

You are advised to spend no longer than 40 minutes answering this section.

Here is a copy of the pre-release material.

DO NOT attempt Tasks 1, 2 and 3 now.

Use the pre-release material and your experience from attempting the tasks before the examination.

#### Pre-release Material

In preparation for the examination candidates should attempt the following practical tasks by **writing and testing a program or programs**.

An auction company has an interactive auction board at their sale rooms, which allows buyers to place bids at any time during the auction. Before the auction starts, the sellers place their items in the sale room with a unique number attached to each item (item number). The following details about each item need to be set up on the interactive auction board system: item number, number of bids, description and reserve price. The number of bids is initially set to zero.

During the auction, buyers can look at the items in the sale room and then place a bid on the interactive auction board at the sale room. Each buyer is given a unique number for identification (buyer number). All the buyer needs to do is enter their buyer number, the item number and their bid. Their bid must be greater than any existing bids.

At the end of the auction, the company checks all the items and marks those that have bids greater than the reserve as sold. Any items sold will incur a fee of 10% of the final bid to be paid to the auction company.

Write and test a program or programs for the auction company.

- Your program or programs must include appropriate prompts for the entry of data, data must be validated on entry.
- Error messages and other output need to be set out clearly and understandably.
- All variables, constants and other identifiers must have meaningful names.

You will need to complete these **three** tasks. Each task must be fully tested.

#### Task 1 – Auction set up.

For every item in the auction the item number, description and the reserve price should be recorded. The number of bids is set to zero. There must be at least 10 items in the auction.

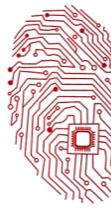
#### Task 2 – Buyer bids.

A buyer should be able to find an item and view the item number, description and the current highest bid. A buyer can then enter their buyer number and bid, which must be higher than any previously recorded bids. Every time a new bid is recorded the number of bids for that item is increased by one. Buyers can bid for an item many times and they can bid for many items.

#### Task 3 – At the end of the auction.

Using the results from TASK 2, identify items that have reached their reserve price, mark them as sold, calculate 10% of the final bid as the auction company fee and add this to the total fee for all sold items. Display this total fee. Display the item number and final bid for all the items with bids that have not reached their reserve price. Display the item number of any items that have received no bids. Display the number of items sold, the number of items that did not meet the reserve price and the number of items with no bids.





### Prerelease Material related thoughts.

**Thought:** Can candidates solve the tasks using programming techniques not listed in the syllabus?

The tasks have to be practiced using a high-level procedural programming language of students' choice and they can all be undertaken using the requirements of the syllabus. However, candidates are free to use more advanced programming techniques to enhance or refine their solutions if they wish. Their work will be rewarded if the solution provided solves the pre-release tasks and addresses the associated question.

So yes - if a 2D array (or any other programming concept) would benefit students in their preparation for the pre-release material, that's fine.

**Thought:** Teachers/students solve the same prerelease material differently. Which one is correct?

Prerelease material is made by CAIE in a way (open ended) that it can be solved using many programming and logic approaches. Thus tend to be different in solutions. Since questions in exam are free of a particular type of solution, it really doesn't matter. Only a deep thought and maximum programming coverage is necessary to come up with all possible exam questions' answers.

**Thought:** Do we really need to remember and practice a programming language?

No, not required.

Syllabus requires codes to be practiced in a programming language but answers in exams always have an option in pseudocode, flowchart or program code.



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

**(a)** All variables, constants and other identifiers should have meaningful names.

**(i)** In Task 1, you had to declare variables.

Write suitable declarations for two variables in pseudocode or program code.

DECLARE i, j : INTEGER

This variable will be used as a counter in count based for...next loops.

DECLARE alreadyFound : BOOLEAN

[2]

This variable will be used as a flag to determine if an item number already exists.

**Note:** This question may appear for any of the variables in Task 1. So just use variables that are required, and not all. This question might not require writing full declaration but only the identifier names.

**(ii)** What is the data structure that you have used in Tasks?

Data structure: **Array**

Declarations:

DECLARE itemNo: ARRAY[1:totItems] OF INTEGER

This array will be used to store item numbers of items in auction.

DECLARE itemDesc : ARRAY[1:totItems] OF STRING

This array will be used to store item description/names of items in auction.

DECLARE itemReservePrice : ARRAY[1:totItems] OF CURRENCY

This array will be used to store item reserved prices of items in auction set by the seller.

DECLARE itemBids : ARRAY[1:totItems] OF INTEGER

This array will be used to store number of bids for the items in auction.

DECLARE itemHighestBid : ARRAY[1:totItems] OF CURRENCY

This array will be used to store highest bid amounts for the items in auction.

DECLARE itemSold : ARRAY[1:totItems] OF Boolean

This array will be used to store/mark an item sold if the highest bid amount is greater than reserved price in auction.

DECLARE itemBuyerNo : ARRAY[1:totItems] OF INTEGER

This array will be used to store items' buyer numbers who participate and bid for items in auction.

**(iii)** It has been decided to record items in arrays of size 500.

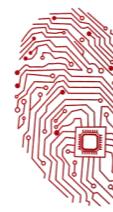
Write the new array declarations that you would use.

```
DECLARE itemNo          : ARRAY[1:500] OF INTEGER
DECLARE itemDesc        : ARRAY[1:500] OF STRING
DECLARE itemReservePrice: ARRAY[1:500] OF CURRENCY
DECLARE itemBids        : ARRAY[1:500] OF INTEGER
DECLARE itemHighestBid  : ARRAY[1:500] OF CURRENCY
DECLARE itemSold        : ARRAY[1:500] OF Boolean
DECLARE itemBuyerNo     : ARRAY[1:500] OF INTEGER
```



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(iv) Declare constants that you have used in task 1 and state what you used each one for.

Constant ..... CONSTANT totItems = 10

Constant..... totItems

Use .....It will be used to in validation and other count based loops.

[4]

(v) Show the design of your algorithm to initialize these variables.

Array:

```
//Initialisation of all arrays
FOR i = 1 To totItems
    itemNo[i] = 0
    itemDesc[i] = ""
    itemReservePrice[i] = 0
    itemBids[i] = 0
    itemHighestBid[i] = 0
    itemSold[i] = FALSE
    itemBuyerNo[i] = 0
NEXT
```

(vi) Store value 209 to array itemID [] element at index 15.

```
itemID[15] ← 209
```

(vii) Show two (2) test data to check reserved price validation in Task1. Explain your choice.

Test Data 1: -47

Explanation: -47 is abnormal test data and will be rejected. The limit check validation rule only accepts positive numbers. User will be shown an error message.

Test Data 2: 125

Explanation: 125 is normal test data and will be accepted. The limit validation rule accepts only positive numbers thus 125 will be accepted.

(viii) Complete the algorithm below to complete Task 1. DONT include any of the validation checks in your algorithm.

SEE SOLVED PRE RELEASE

[5]

(b)

(i) Comment on the efficiency of your design for all tasks.

[1]

- Have used standard keyword and meaningful variable names.
- Have used single loop instead of repeating same piece of code.
- Have indentation
- Use of CONSTANT to hold fixed values.
- Uses IF statement to output
- Use of validations and appropriate error message when validation fails
- Use of SD arrays to hold data in manageable form
- Use of itemSold boolean type array to mark an item sold
- FOR...NEXT count based loop works according to the total items constants



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(ii) Show one of the validation only used in Task 1 using pseudocode, programming statements or a flowchart.

OR

Show how your program validated that item numbers being entered are unique. Use pseudocode or programming statements.

[8]

```
REPEAT //existence check validation
    alreadyFound = False
    INPUT "Enter item number: ", INo
    For j = 1 To totItems
        IF INo = itemNo[j] THEN alreadyFound = True
    Next
Until alreadyFound = False
```

(iii) Use a different loop statement for the same validation shown above:

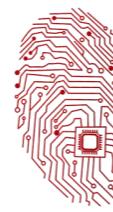
```
REPEAT //existence check validation
    alreadyFound = FALSE
    INPUT "Enter item number: ", INo
    i = 0
    WHILE (alreadyFound = FALSE) AND (i < totItems)
        i = i + 1
        IF itemNo[i] = item alreadyFound = TRUE
    END WHILE
UNTIL alreadyFound = False
```

(c)

(i) How will you search the array ItemNo [ ] to look for a particular number using pseudocode, program code or flowchart?

```
Count ← 0, ID=0
INPUT ID
For Count ← 1 to totItems
    IF itemNo[Count] = ID Then OUTPUT 'FOUND', END
END FOR
OUTPUT "Item not found"
```





### **Task 1: Explanation**

#### **OPERATIONS**

1. Declarations
  - a. CONSTANTS
  - b. Variables
  - c. Arrays
2. Initialisation
3. Arrays Populate
4. Array Linear Searching
5. Existence Check (Based on Linear Searching)

In task 1 we first declared a constant `totItems` so that we can use it for the array declaration, count based loops and for use in validations. Seven arrays were declared to be used throughout the program alongside variables for the count based loops and flagging of search operation.

All variables are then initialised and arrays were placed inside a count based loop based on variable `i` that starts from lowerbound 1 to upper bound `totItems` and initializes all arrays to their respective futile values. We initialized strings to null "", numbers (integer, real and currency) to zero (0) and Boolean to False.

Then we populated the array one by one record in a loop and used the existence check by applying a linear array search technique not to allow any item number input that has already found in the `itemNo [ ]` array.





### Task 2: Explanantion

I wrote outer condition based loop for the possible continuous bidding

- declared a boolean variable "more" as Flag to loop
- Buyer will be asked if they further want bid or not.
- As per their (buyer) reply loop will work or breaks out

Inside the loop

- Buyer will be asked to input item number to bid for
- A linear array search over itemNo [ ] array will be carried out
  - IF the item number buyer looking for is found
    - THEN
      - Description and highest bid prices are shown
      - Consent for new bid is taken through operation 3.
    - ELSE
      - Break out to outer loop
  - ELSE

If buyer wants to bid for current item

THEN

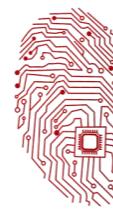
- Buyer Number and new bid is input
- IF new bid is less than last highest bid
  - THEN
    - Validation is done through operation 4
    - number of bids and new bid is updated in respective arrays

Validation (range check) through loop for not accepting bid less than last highest bid for current itemNo i is used.



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

### Task 3: Explanation

#### Code part 1:

```
FOR i = 1 To totItems
    x1: IF itemHighestBid[i] >= itemReservePrice[i]
        THEN
            itemSold[i] = TRUE
    x3: TotalFee = TotalFee + [itemHighestBid[i] * 0.1]
    x2: itemSoldCount = itemSoldCount + 1

    x1: OUTPUT "Item No. = ", itemNo[i]
    OUTPUT "Reserve Price = ", itemReservePrice[i]
    OUTPUT "Highest Bid = ", itemHighestBid[i]
    OUTPUT ""

    END IF
NEXT
```

#### Explanation:

**x1:** In a loop we check every array element of itemHighestBid[] and itemReservePrice[] arrays to check which item numbers have crossed their reserve prices in bidding and marks it sold by moving TRUE value to itemSold[] array. We also output item numbers, reserve price and highest bid of the item sold.

**x2:** For every time an item is marked sold we also count it

**x3:** Every time an item is sold we total 10% of its highest bid as auction company's fee.

#### Code part 2:

```
x1: FOR i = 1 To totItems
    IF itemSold[i] = FALSE THEN itemNotSoldCount = itemNotSoldCount + 1
    x1: IF itemHighestBid[i] < itemReservePrice[i]
        THEN
            notReachedResdPrice = notReachedResdPrice + 1
        END IF
    x2: IF itemBids[i] = 0 THEN noBids = noBids + 1
NEXT
```

**x1:** For every element in arrays itemHighestBid[] and itemReservePrice[] we count that how many items have not reached their minimum reserve prices.

**x2:** For every element in itemBids [] we count that how many items' bid remains 0 means they were never bid for.



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

### Code part 3:

```
IF notReachedResdPrice > 0
THEN
    OUTPUT "Items Not Reached the Reserved Prices:"
    FOR i = 1 To totItems
        IF itemHighestBid[i] < itemReservePrice[i]
        THEN
            OUTPUT "Item No: ", itemNo[i]
            OUTPUT "Final Bid Price: ", itemHighestBid[i]
        END IF
    NEXT
END IF
OUTPUT ""
```

### Explanation:

If there are number of item that have not reached their reserve price are greater than 0 then a count based loop go through the `itemHighestBid[]` and `itemReservePrice[]` arrays and wherever system finds that `itemHighestBid[]` is less than `itemReservePrice[]` it outputs item number and final bid prices.

### Code part 4:

```
IF noBids > 0
THEN
    OUTPUT "Items That Have No Bids:"
    FOR i = 1 To totItems
        IF itemBids[i] = 0 THEN OUTPUT "Item No: ", itemNo[i]
    NEXT
END IF
OUTPUT ""
```

### Explanation:

If no of bids counted earlier is greater than 0 then a count based loop go through the `itemBids []` array and wherever it finds `itemBids []` array having a 0 stored it outputs `itemBids []` location's item number.

### Code part 5:

```
OUTPUT "Number of Items Sold: ", itemSoldCount
OUTPUT "Number of Items that Did Not Meet The Reserve Price: ",
       notReachedResdPrice
OUTPUT "Number of Items With No Bids: ", noBids
```

### Explanation:

All the variables containing number of items sold, item not reached their reserved prices and item with no bids are output as an appropriate message.





### Section B

- Q1. The following algorithm inputs 20 numbers and outputs how many numbers were positive ( $> 0$ ) and how many numbers were negative ( $< 0$ ).

```
1 negative = 1
2 positive = 1
3 for count = 1 to 20 do
4   input number
5   if number < 0 then negative = negative + 1
6   if number > 0 then positive = positive + 1
7   count = count + 1
8   print negative, positive
9 next count
```

There are three different errors in this algorithm.

Locate each error and give the reason why you think it is an error.

[6]

1 mark for each error and 1 mark for reason why it is an error

- line 1/negative=1 and/or line 2/positive=1
- negative and/or positive should be set to zero
- line 7/count=count+1
- don't need a count within a for .... to next loop
- replace loop with a repeat...until loop
- line 8/print negative, positive or line 9/next count
- outputs should come after the next count statement

[6]

- Q2. The following section of a pseudocode algorithm should:

- input 500 numbers
- generate a ratio called k
- output each value of k
- output how many numbers were larger than 10

```
10  total = 1
20  FOR x = 1 TO 500
30      IF number < 10 THEN total = total + 1
40      k = x / number
50      x = x + 1
60      OUTPUT k
70  NEXT x
80  OUTPUT x
```

(a) There are five errors in the above code.

Locate these errors and suggest a correction.

error 1 .....

correction .....

.....

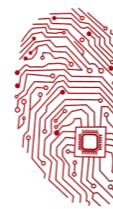
error 2 .....

correction .....

.....

error 3 .....





correction .....  
.....  
error 4 .....  
correction .....  
.....  
error 5 .....  
correction .....  
..... [5]

(a) 1 mark for each error and suggested correction (accept description or example of corrected pseudocode).

error: line 10: total = 1  
correction: totals should be set to zero; total = 0  
error: line 30: ... number < 10 ...  
correction: check should be made if number > 10; ... number > 10 ...  
error: no input inside loop  
correction: input number  
error: line 50: x = x + 1  
correction: for ... to loops don't need a counter; remove line 50 altogether  
error: line 80: output x  
correction: output should be total value; output total

[5]

(b) The corrected algorithm was converted to a computer program and run. However, after several numbers were input, the program stopped and an error message was generated, showing that there was a further error at line 40 ( $k = x / \text{number}$ ). State what could cause this error to occur.

.....  
.....  
Suggest a change to line 40 to overcome this problem.  
.....  
.....  
..... [2]

(b) division by zero error (or similar description of error produced when dividing by 0)  
add an error trap after input of number

e.g. 40 if number = 0 then k = 0 else k = x/number

[2]

Q3. The following pseudocode algorithm should:

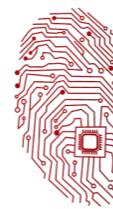
- input up to 20 numbers
- stop if the sum of the input numbers **exceeds** 50
- output the final sum

```
10 count = 0
20 REPEAT
30 INPUT n
40 n + sum = sum
50 IF sum = 50 THEN count = 20
60 count = count + 1
70 UNTIL count = 20
80 OUTPUT n
```



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

There are **five** errors in this algorithm.

Locate these errors and suggest a correction.

error 1 .....

correction .....

.....  
error 2 .....

correction .....

.....  
error 3 .....

correction .....

.....  
error 4 .....

correction .....

.....  
error 5 .....

correction .....

.....

[5]

**1 mark for each error located with corresponding correction (description or corrected pseudocode acceptable)**

**error:** line 10: sum not initialised  
**correction:** sum = 0

**error:** line 40: incorrect formula for sum  
**correction:** sum = sum + n

**error:** line 50: incorrect IF statement  
**correction:** IF sum > 50 THEN .....

**error:** lines 50 and 60: value of count causes a problem e.g. loop never ending  
**correction:** either count = 19 on line 50  
or count = count + 1 between lines 30 and 40  
or any other correct solution

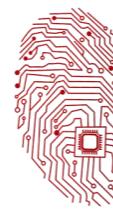
**error:** line 80: output of n is incorrect  
**correction:** output sum or print sum

[5]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q4. Jatinder uses Internet banking.  
This pseudocode checks her PIN.

```
c ← 0
INPUT PIN
x ← PIN
REPEAT
    x ← x/10
    c ← c + 1
UNTIL x < 1
IF c <> 5
    THEN
        PRINT "error in PIN entered"
    ELSE
        PRINT "PIN OK"
ENDIF
```

(a) What value of c and what message would be output if the following PINs were entered?

5 1 0 2 0 Value of c:

Message:

5 1 2 0 Value of c:

Message: [2]

(b) What type of validation check is being carried out here? [1]

**(a) 1 mark for value of c and message**

**51020:** value of c: **5**  
message: **PIN OK** (1 mark)

**5120:** value of c: **4**  
message: **error in PIN entered** (1 mark)

**(b) length check**





Q5. Read this section of program code that inputs twenty (20) numbers and then outputs the largest number input.

```
1   h = 0
2   c = 0
3   REPEAT
4       READ x
5       IF x > h THEN x = h
6       c = c + 1
7       PRINT h
8   UNTIL c < 20
```

There are three errors in this code.

Locate these errors and suggest a corrected piece of code.

[3]

**1 mark for each error identified + suggested correction**

line 5: this should read **IF x > h THEN h = x**

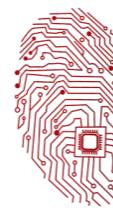
line 7: **PRINT h** should come after the end of the repeat loop

line 8: this should read **UNTIL c = 20** or **UNTIL c >= 20** or **UNTIL c > 19**



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q6. A computer program is required which inputs 10 numbers, multiplies them together and finally outputs the answer (the product). The following algorithm has been written to do this.

```
1 count = 0
2 product = 0
3 while count <= 10 do
4   input number
5   product = product * number
6   count = count + 1
7   print product
8 endwhile
```

- (a) There are three errors in the algorithm. Locate and describe these errors. [3]  
(b) A while ... do loop has been used in the algorithm. State another type of loop that could have been used. [1]

(a) error 1: product = 0 on line 2  
should use product = 1  
error 2: loop control, count <= 10 on line 3  
should use count < 10 or alternatively alter count value on line 1 to count = 1  
error 3: print value of product inside loop on line 7  
output should come after the endwhile statement [3]

(b) Accept either of the following loop controls:

Repeat for count = 1 to 10  
OR  
until count = 10 next count  
(accept repeat)  
until count > 11  
if line 1 changed to count = 1) [1]

Q7. A golf course charges \$10 for each game of two people. Each additional person incurs a further charge of \$2 per game. If they book two or more games in advance, they get a 10% discount on the total charge.

The following program has been written in pseudocode to calculate the charges for a game.

```
1 extracost = 0
2 input numberpeople, numbergames
3 charge = 10 * numbergames
4 extrapeople = numberpeople - 2
5 if numberpeople < 2 then extracost = 2 * extrapeople * numbergames
6 charge = extracost
7 if numbergames > 1 then charge = charge * 0.1
8 print charge
```

There are three errors in the program. Locate these errors and suggest a correct piece of coding. [6]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

1 mark for each error identified + 1 mark for each suggested correction

– error

line 5: numberpeople < 2 is incorrect

correction:

numberpeople > 2

– error

line 6: the formula/charge = extracost is incorrect

correction:

charge = extracost + charge

– error

line 7: discount calculation/charge = charge \* 0.1 is incorrect,

correction:

charge = charge \* 0.9

[6]

Q8. The following algorithm should:

- input ten numbers
- output the largest number input
- output the average value of the input data

10 largest = 0

20 sum = 0

30 for x = 1 to 10

40 input x

50 if x > largest then x = largest

60 output largest

70 sum = sum + x

80 next x

90 average = sum \* 10

100 output average

There are four errors in this algorithm.

Locate these errors and suggest a correction.

1 mark for identification of error and suggested correction (description or corrected pseudocode)

Error: line 40: input x; using same input value as loop variable will cause problems or line 30: for x = 1 to 10

correction: change loop variable e.g. for count = 1 to 10 or change input variable e.g. input number

error: line 50: formula is reversed

correction: .... then largest = x (or largest = number)

error: line 60: output shouldn't be inside the loop

correction: 100 output average, largest

error: line 90: incorrect formula

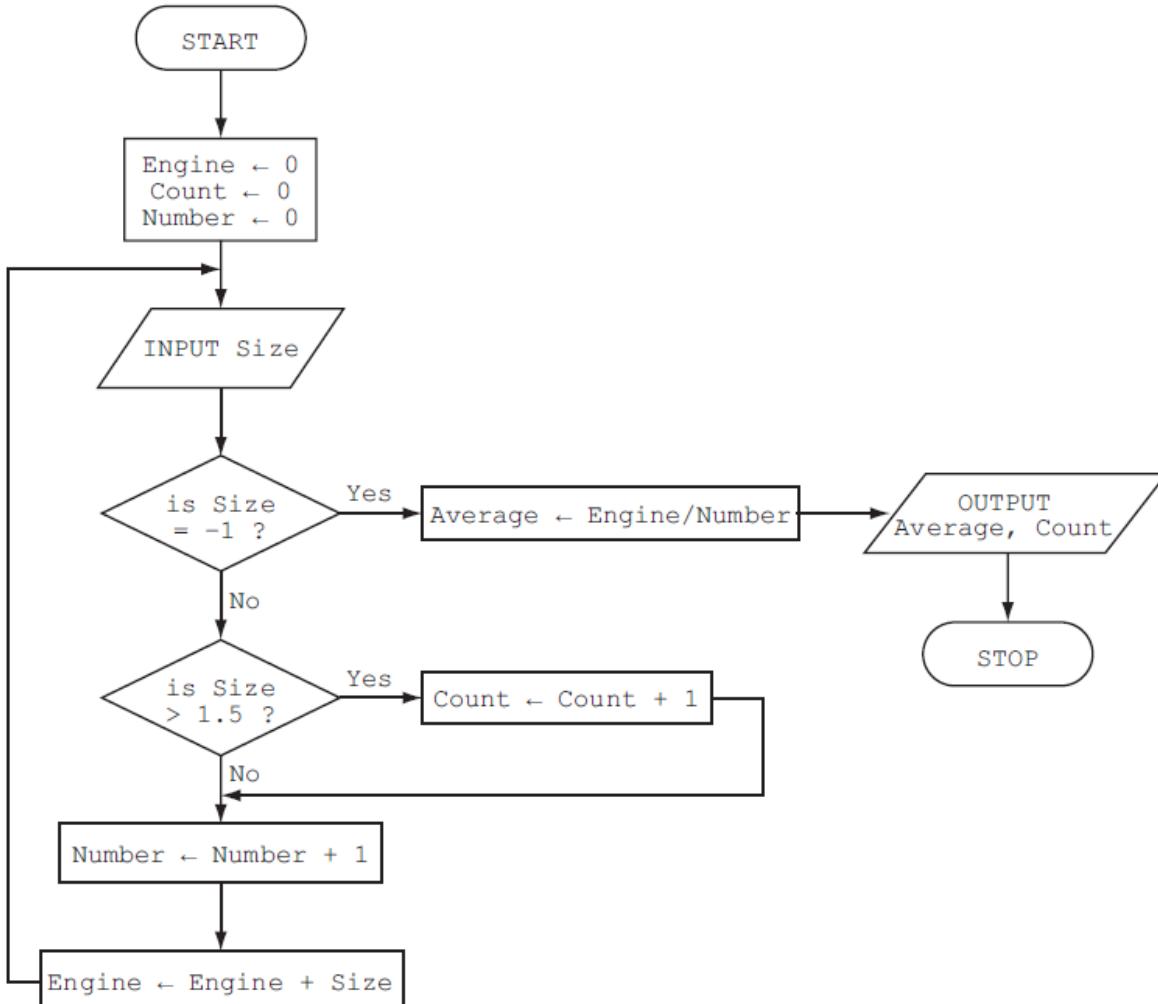
correction: average = sum/10

[4]





- Q9. The flowchart inputs the size of a number of car engines; a value of -1 stops the input. This information is output: average engine size and number of engines with size > 1.5



Computer Science 2210 (P2)

# ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

1.8, 2.0, 1.0, 1.3, 1.0, 2.5, 2.0, 1.3, 1.8, 1.3, -1|

[6]



03-111-222-ZAK



# OlevelComputer

# AlevelComputer



@zakonweb



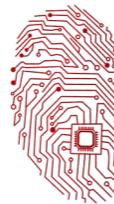
[zak@zakonweb.com](mailto:zak@zakonweb.com)



[www.zakonweb.com](http://www.zakonweb.com)

# Computer Science 2210 (P2)

ZAK's Recommended Question Bank for  
CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Engine	Count	Number	Size	Average	OUTPUT
0	0	0	1.8		
1.8	1	1	2.0		
3.8	2	2	1.0		
4.8		3	1.3		
6.1		4	1.0		
7.1		5	2.5		
9.6	3	6	2.0		
11.6	4	7	1.3		
12.9		8	1.8		
14.7	5	9	1.3		
16.0		10	-1		
				1.6	
					1.6, 5

(1 mark)

(1 mark)

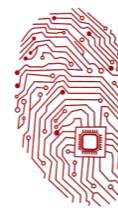
(1 mark)

(1 mark)

(1 mark)

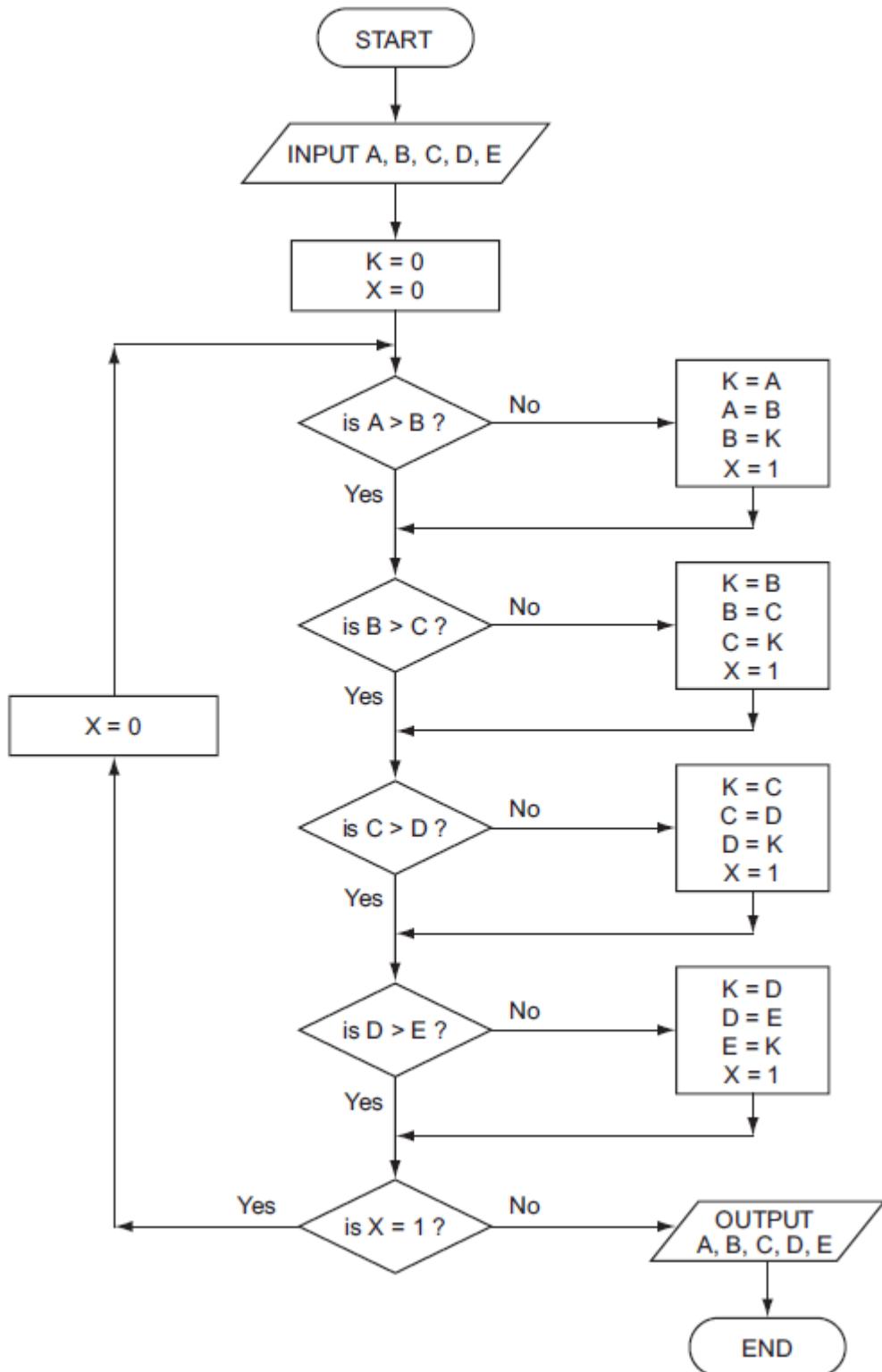
(1 mark)





Q10.

Study the following flowchart very carefully.



(a) Complete the trace table for this flowchart using the following test data:

3, 5, 1, 4, 8

[5]

(a) a

A	B	C	D	E	K	X
3	5	1	4	8	0	0
5	3				3	1
		4	1		1	1
			8	1	1	1
						0
	4	3			3	1
		8	3		3	1
						0
	8	4			4	1
						0
8	5				5	1
						0

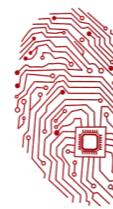
< ----- 1 mark ----- >< 1 mark >< ----- 1 mark ----- >< 1 mark >< 1 mark >

[5]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(b) What values are output from the flowchart using the above test data?

(b) 8, 5, 4, 3, 1

[1]

(c) What function is this flowchart carrying out?

(c) SORT/ORDER (descending) routine

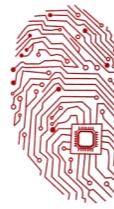
[1]

(d) What would happen if the value of X wasn't set to 0 in the return loop of the flowchart?

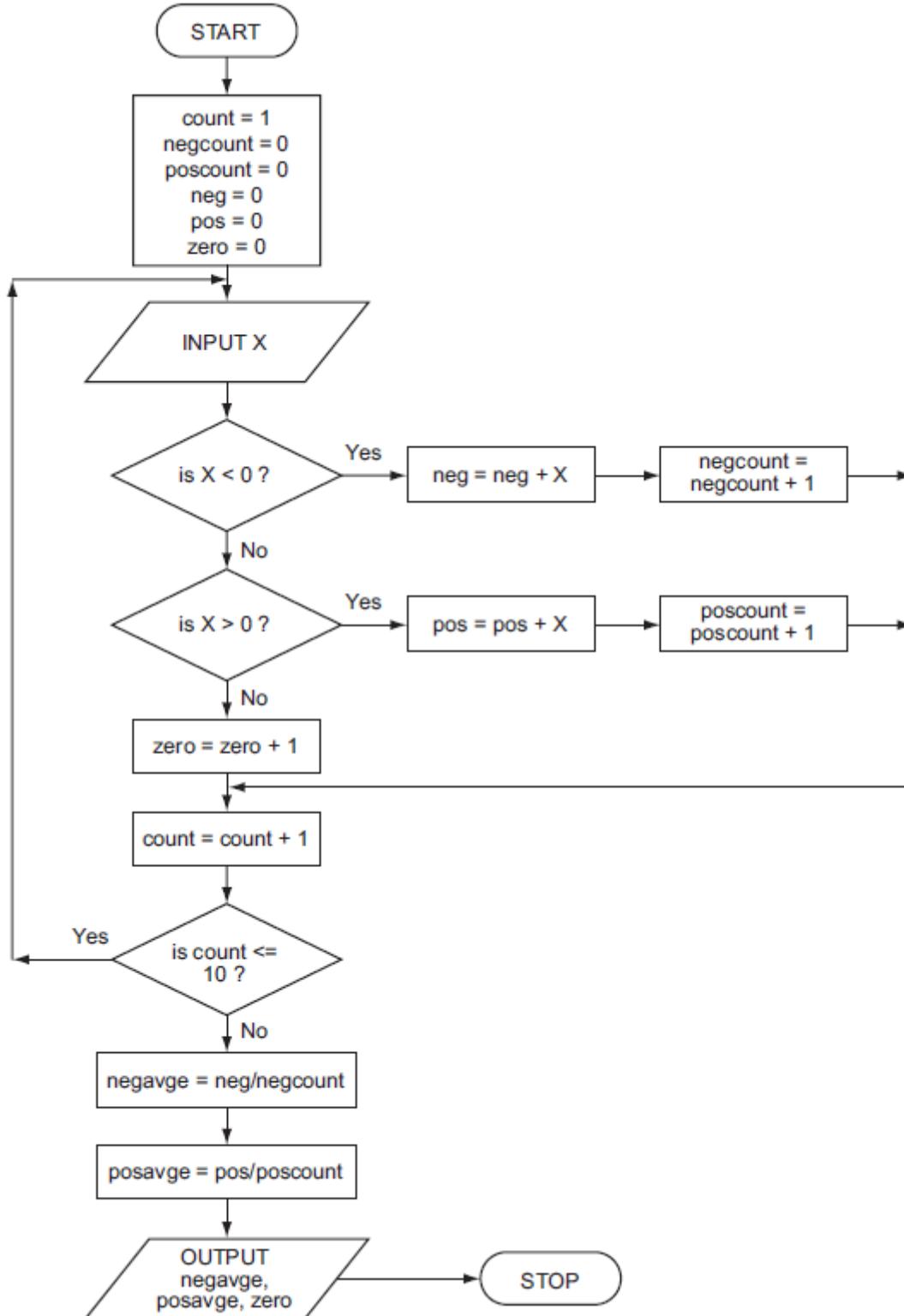
(d) – would continue looping round even when sorting complete  
– loop would never end/infinite loop

[1]





Q11 Study the following flowchart very carefully.



# Computer Science 2210 (P2)

# ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Complete the trace table for the flowchart using the following data:

0, 3, 5, 6, -4, -1, 0, 0, -4, 10

[6]



03-111-222-ZAK



# OlevelComputer

# AlevelComputer



@zakonweb



[zak@zakonweb.com](mailto:zak@zakonweb.com)



[www.zakonweb.com](http://www.zakonweb.com)

# Computer Science 2210 (P2)

ZAK's Recommended Question Bank for  
CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- 10** (NOTES: Additional 0s in any column (UNLESS THEY ARE JUST THE REPEAT OF 0 VALUES) lose the mark for that column)

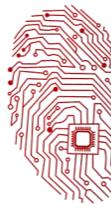
If columns 1 to 7 are wrong there can be one mark for initialisation (0 0 0 0 0 1) and a mark for the correct output -3, 6).

negcount	poscount	neg	pos	zero	count	X	negavge	posavge
0	0	0	0	0	1			
				1	2	0		
		1	3		3	3		
	2		8		4	5		
	3		14		5	6		
1		-4			6	-4		
2		-5			7	-1		
				2	8	0		
				3	9	0		
3		-9			10	-4		
	4		24		11	10		
							-3	6

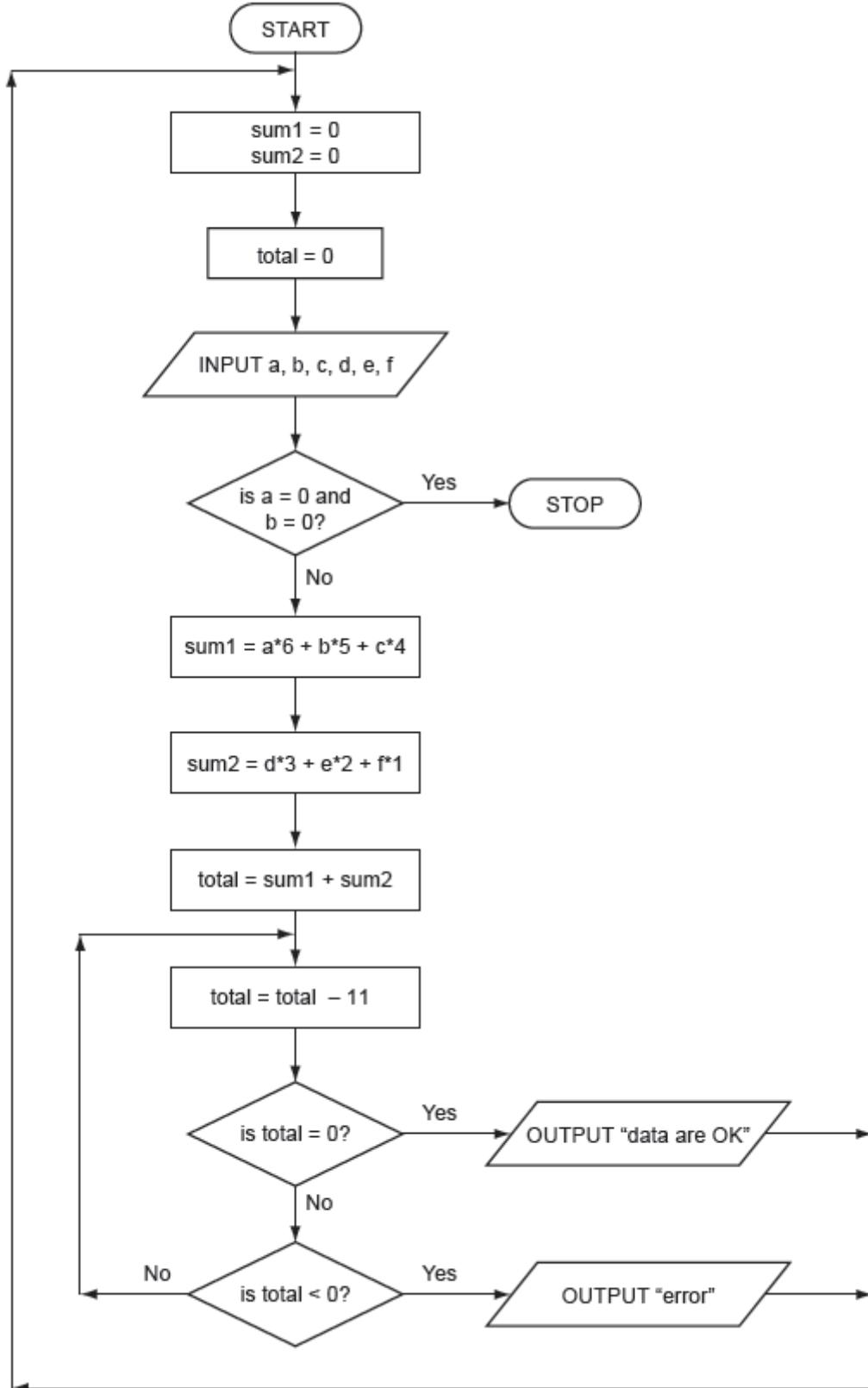
<----- 1 mark -----> 1 mark 1 mark 1 mark <----1 mark ----> <----- 1 mark ----->

[6]



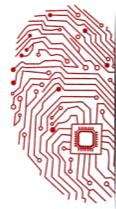


Q12 Study the following flowchart very carefully.



**Computer Science 2210 (P2)**

# ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Complete the trace table for this flowchart using the following data:

4, 3, 2, 0, 0, 8

5, 0, 1, 2, 3, 4

0, 0, 0, 0, 0

[5]



03-111-222-ZAK



# OlevelComputer

# AlevelComputer



@zakonweb



[zak@zakonweb.com](mailto:zak@zakonweb.com)



[www.zakonweb.com](http://www.zakonweb.com)

**14** NOTE: sum1, sum2 and total MUST be initialised for all three inputs to get the mark; allow repetition in any of the columns EXCEPT the OUTPUT column (e.g. sum1 can be 0, 47, 47, 47, 47, 47, 47);

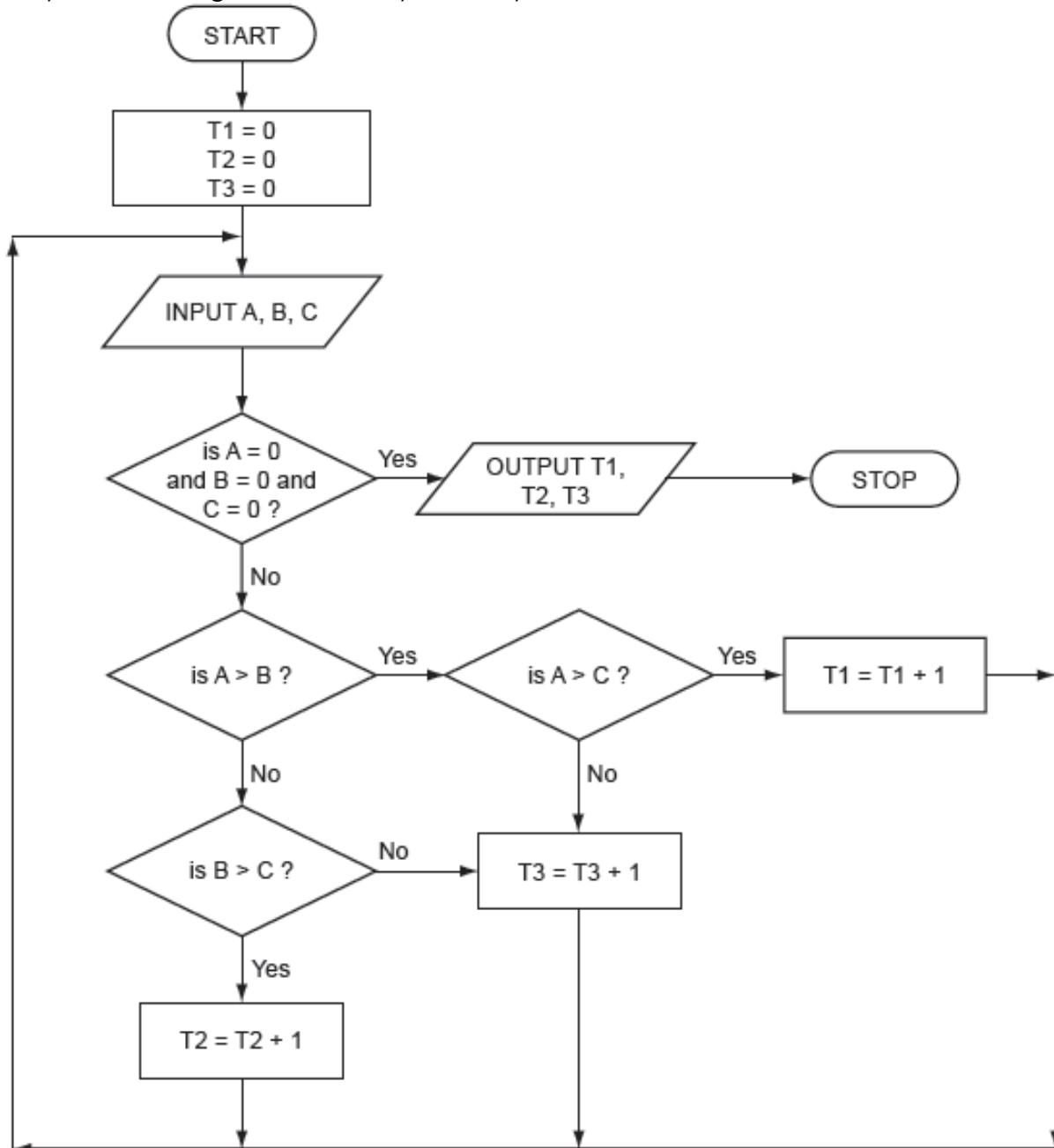
sum1	sum2	total	a	b	c	d	e	f	OUTPUT
0	0	0	4	3	2	0	0	8	
47	8	55							
		44							
		33							
		22							
		11							
		0							data are OK
0	0	0	5	0	1	2	3	4	
34	16	50							
		39							
		28							
		17							
		6							
		-5							error
0	0	0	0	0	0	0	0	0	
1 mark	1 mark	1 mark <-----				1 mark ----->			1 mark

[5]





Q13. Study the following flowchart very carefully.



Computer Science 2210 (P2)

# ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(a) Complete the trace table for the flowchart using the following data:

3, 2, 1

4, 8, 7

6, 0, 3

5, 6, 9

4, 11, 3

0, 0, 0

[5]

**(b)** This flowchart does not give correct answers for certain sets of test data.

Suggest a data set that would give an incorrect answer.

Give a reason for your choice.

data set .....

reason.....

[2]

..[2]



03-111-222-ZAK



OlevelComputer  
AlevelComputer



@zakonweb



[zak@zakonweb.com](mailto:zak@zakonweb.com)



[www.zakonweb.com](http://www.zakonweb.com)

# Computer Science 2210 (P2)

ZAK's Recommended Question Bank for  
CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(a)

T1	T2	T3	A	B	C	OUTPUT
0	0	0				
			3	2	1	
1						
	1		4	8	7	
2			6	0	3	
		1	5	6	9	
	2		4	11	3	
			0	0	0	
						2, 2, 1

1 mark

1 mark

1 mark

<----- 1 mark ----->

1 mark

If no marks are awarded for the columns then 1 mark can be given for correct initialisation of T1, T2 & T3 as shown in the first row above.

[5]

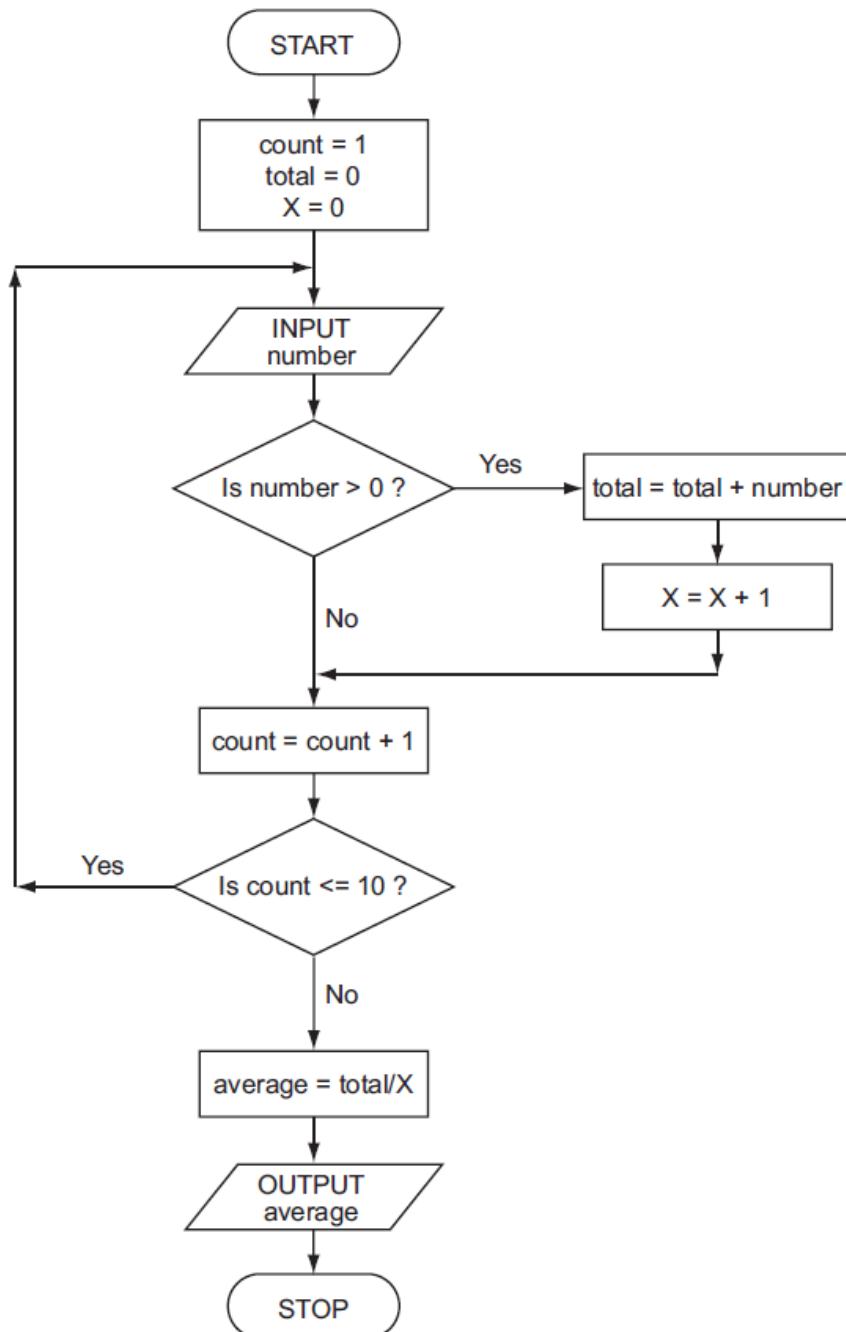
- (b) – any data set (except 0, 0, 0) where 2/3 of the numbers are the same e.g. 2, 8, 8  
– flowchart does not allow for numbers which have the same value

[2]



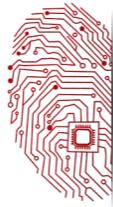


Q14. Study the following flowchart very carefully:



**Computer Science 2210 (P2)**

# ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(a) Complete the trace table for the following data set:

$$15, -2, 0, 8, 0, 21, -8, -12, 1, 25$$

**(b)** What is the purpose of this flowchart?

[ 1 ]

**5 (a)**

co

count	number	total	x	average	OUTPUT
1		0	0		
2	15	15	1		
3	-2				
4	0				
5	8	23	2		
6	0				
7	21	44	3		
8	-8				
9	-12				
10	1	45	4		
11	25	70	5	14	14

1

<----- 1 mark -----><- 1 mark -><- 1 mark -><----- 1 mark ----->

[4]

(b) Find the average of all positive numbers entered

[1]



03-111-222-7AK



# OlevelComputer

# AlevelComputer



@zakonweh

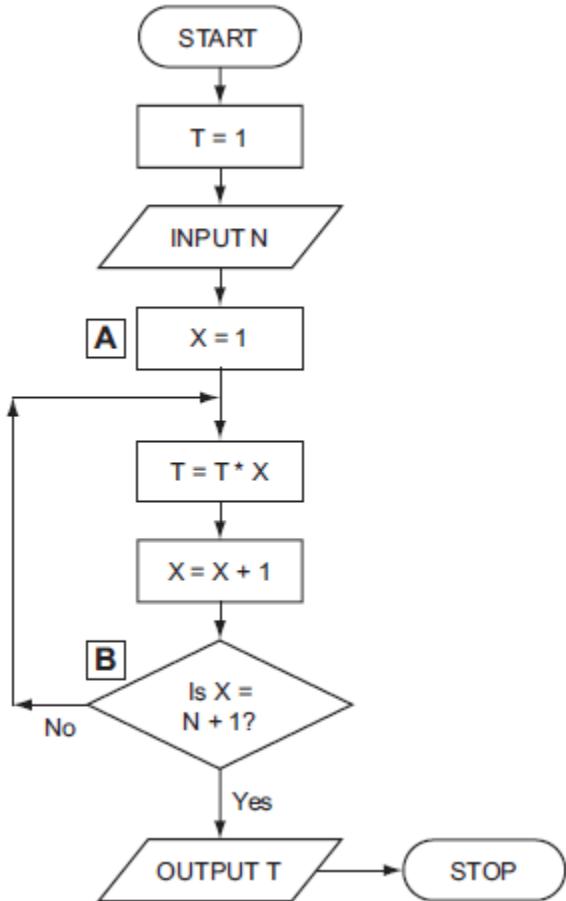


[zak@zakonweb.com](mailto:zak@zakonweb.com)



[www.zakonweb.com](http://www.zakonweb.com)

Q15. Study the flowchart very carefully.



**(a)** Complete the table to show what outputs you would expect for the two inputs.

Input N	Output T
5	
1	

[2]

**(b)** Write down a possible LOOP construct for the section A to B in the flowchart using pseudocode.

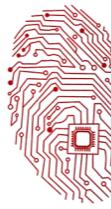
| (a) 120  
| 1

[2]

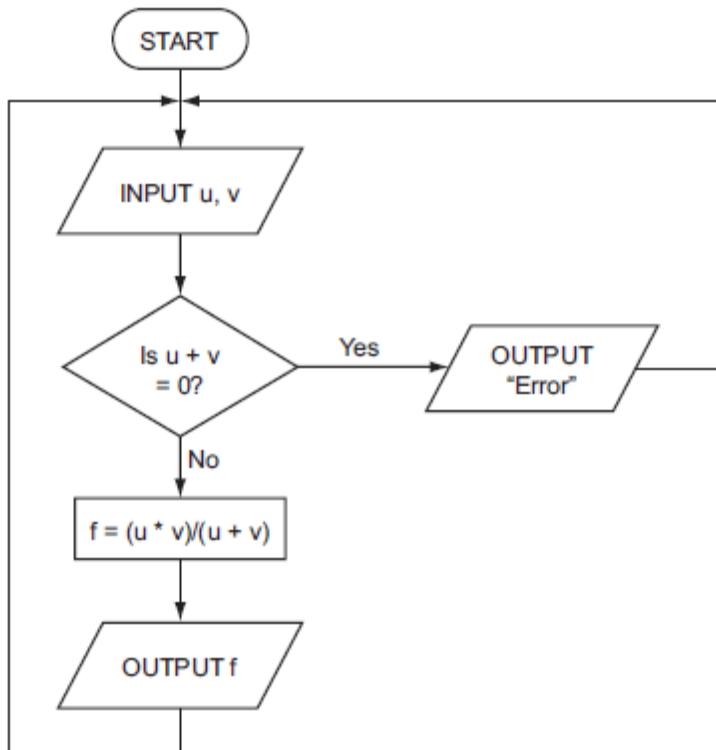
(1 mark for correct first line of loop construct)  
(1 mark for correct loop control and last line of loop construct)

[2]





Q16. The following flowchart inputs two numbers, carries out a calculation and then outputs the result.



(a) Complete the following table for the three sets of input data.

INPUT		OUTPUT
u	v	
5	5	
6	-6	
12	4	

[3]

(a) 2.5  
 Error  
 3

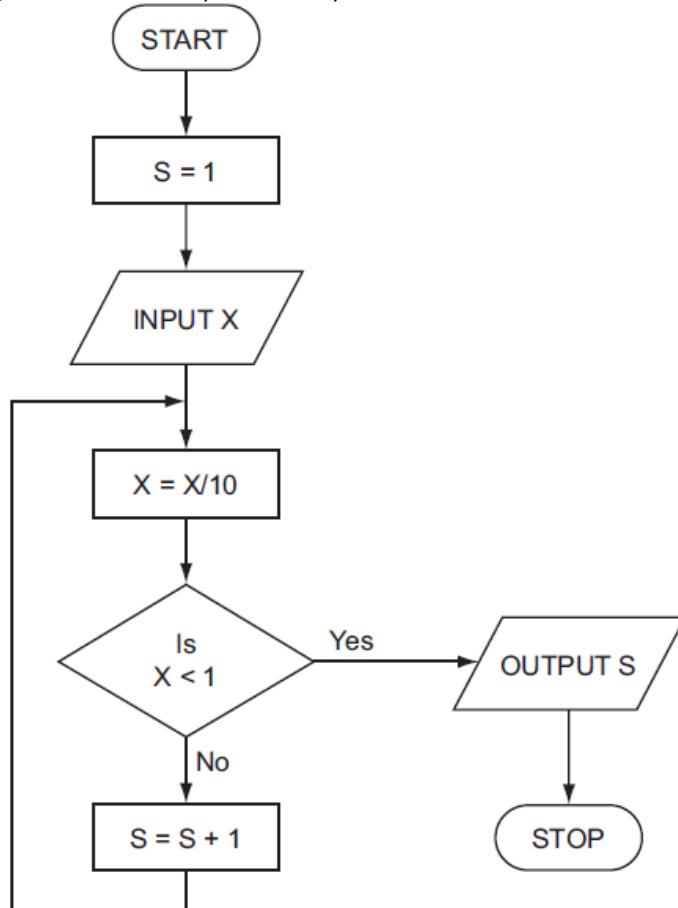
[3]

(b) The above algorithm has been placed in a library of routines. Give one advantage of doing this. [1]

- (b) Any one from:  
 would be fully tested  
 doesn't need to be re-written each time section of program needed [1]



Q17. Study the following flowchart very carefully.



(a) Complete the following table showing the expected output from the flowchart for the three sets of input data:

INPUT X	OUTPUT S
48	
9170	
-800	

[3]

(a) 2  
4  
1

[3]

# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(b) Input data needs to go through a validation process.

(i) Explain the term validation.

(ii) Describe one type of validation check.

[2]

(b) (i) Any one point from:

computer check on input data

**check data is wrong/correct = 0**

detects any data which is incomplete or not reasonable

(ii) Any one point from:

length check – e.g. only 30 characters in name field

character check – e.g. name doesn't contain numeric chars

range check – e.g. day of month in date is between 1 and 31

format check – e.g. date in the form xx/yy/zz

check digit – e.g. end digit on bar code to check if it is valid

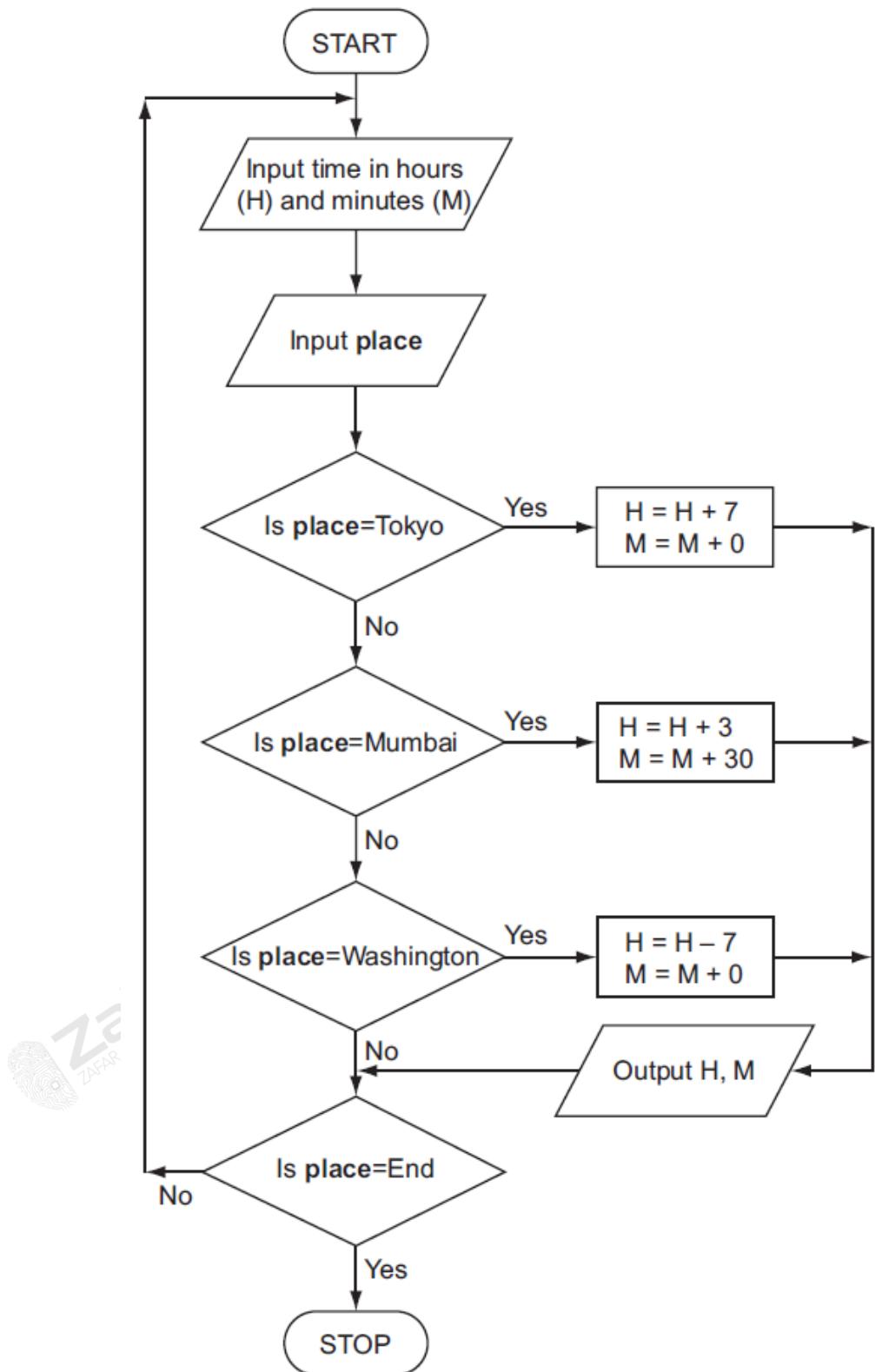
type check – e.g. integer, real

(presence check = 0)

[2]

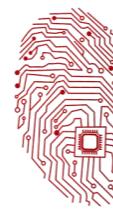
- Q18. Majid lives in Cairo but often travels to Tokyo, Mumbai and Washington. A flow chart has been written so he can work out the local time in these three places.





# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- (a) What output would be produced from the following input?

Input			Output	
place	hours (H)	minutes (M)	H	M
Tokyo	11	15		
Mumbai	15	10		

[2]

- (b) What problem would occur if place = Mumbai and H = 15 and M = 30?

.....  
.....  
.....

[1]

- (c) What problem would occur if place = Washington and H = 4 and M = 0?

.....  
.....  
.....

[1]

- (a)    H            M  
      18            15  
      18            40

[2]

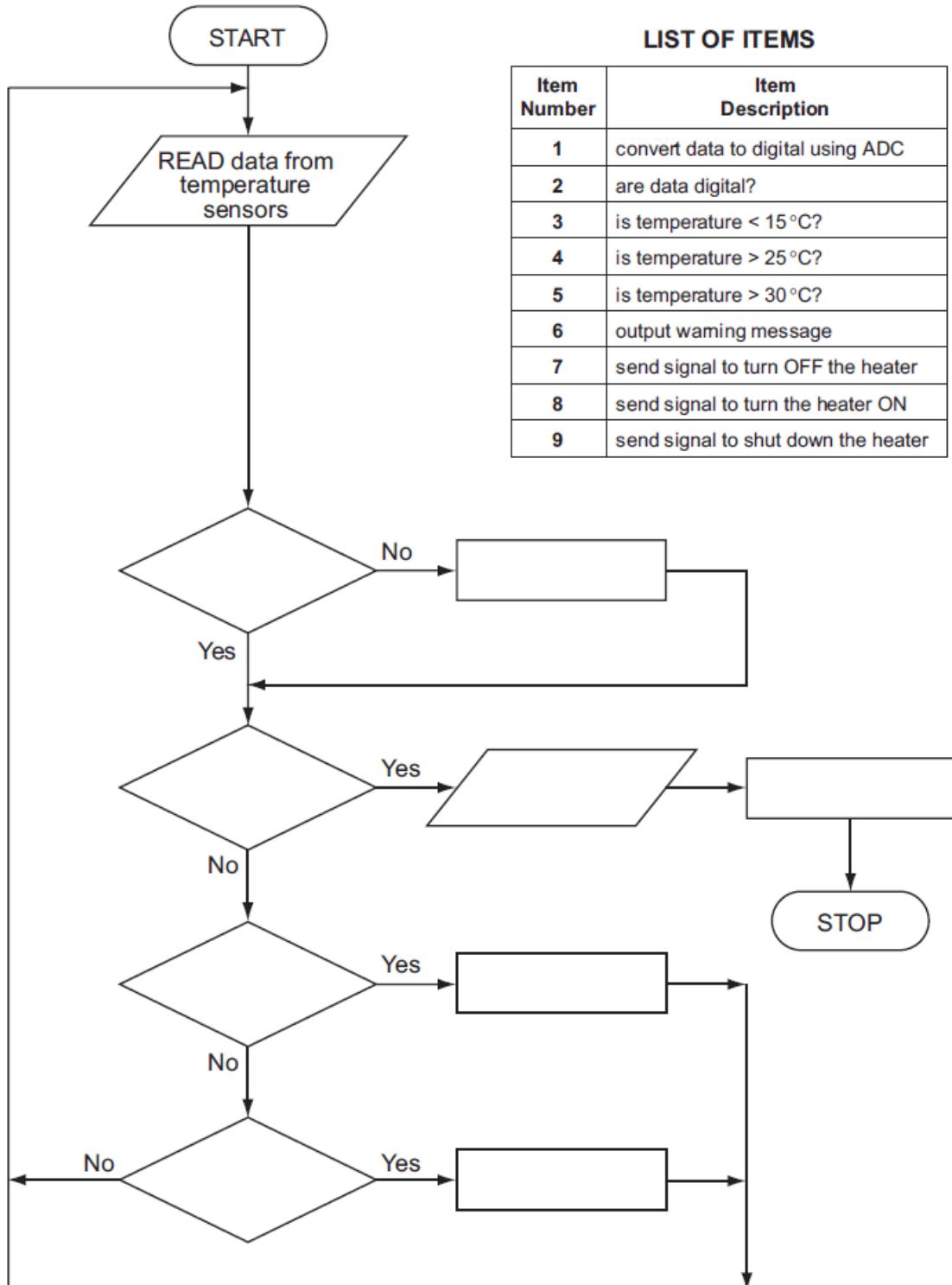
- (b) Any one point from:  
M would become 60 and should be 0 for correct time  
H would become 18 and should be 19 for correct time [1]
- (c) Would get a negative answer for H [1]





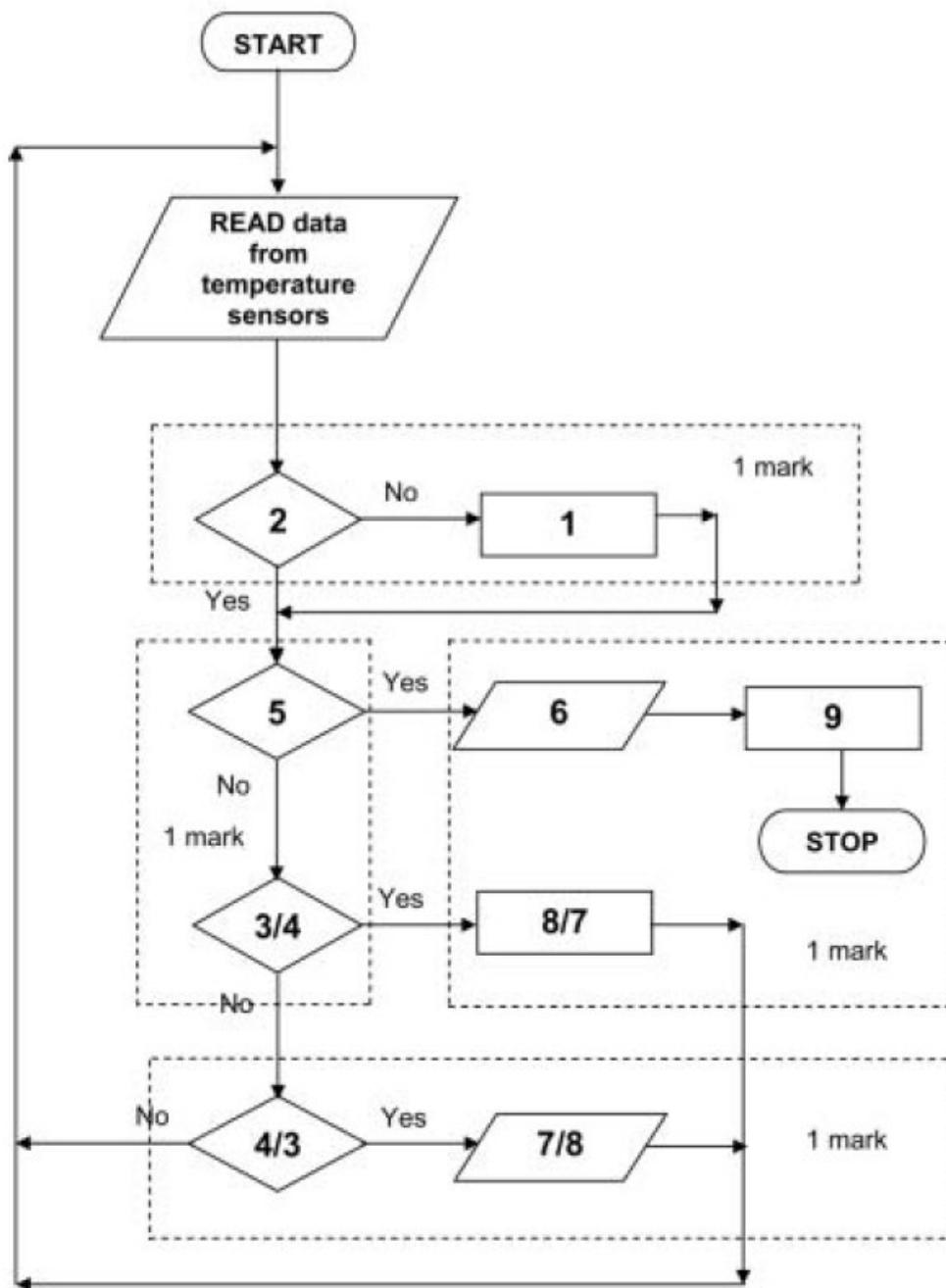
- Q19. A heating system is being controlled by sensors and a computer. The temperature must be kept between 15°C and 25°C. If 30°C is exceeded a warning message is generated and the system shuts down.

A flowchart of the process is shown below. Some of the items are missing.  
Complete the flowchart, using item number only, from the list of items given.



[4]





(3 and 8 AND 4 and 7 MUST be marked in PAIRS)  
(accept the phrases)

[4]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q20. An algorithm has been written to input six temperatures for every day of the year (365 days). The outputs are:

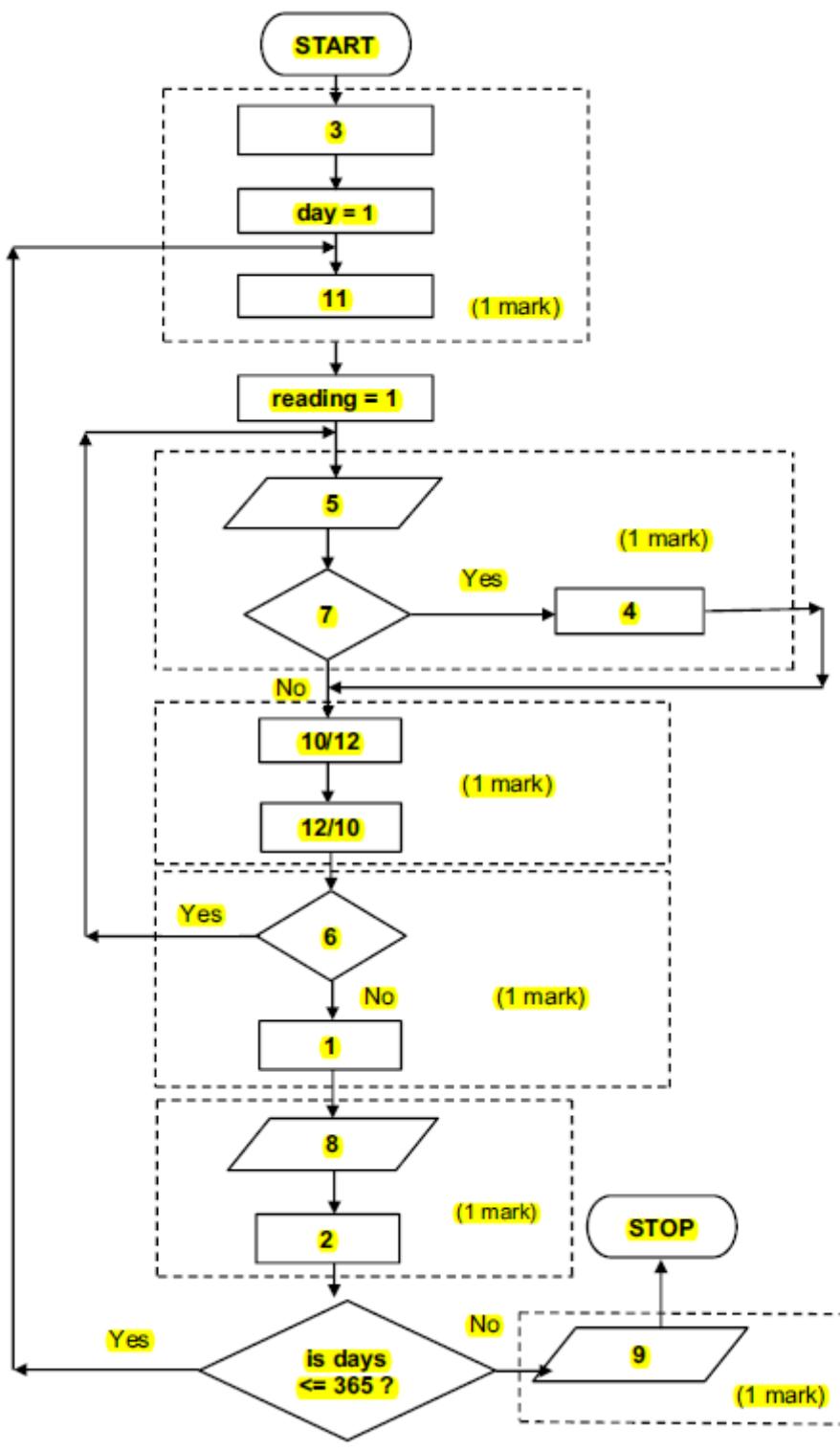
- the average daily temperature for each day
- the highest recorded temperature for the whole year

The algorithm is in the form of a flowchart on the next page. However, several of the statements are missing.

Using instruction number **only**, complete the flowchart using the following list of instructions:

Instruction number	Instruction
1	average = total / 6
2	day = day + 1
3	high = -200
4	high = temperature
5	input temperature
6	is reading <= 6 ?
7	is temperature > high ?
8	output average
9	output high
10	reading = reading + 1
11	total = 0
12	total = total + temperature



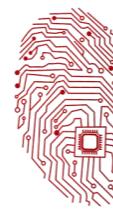


[6]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



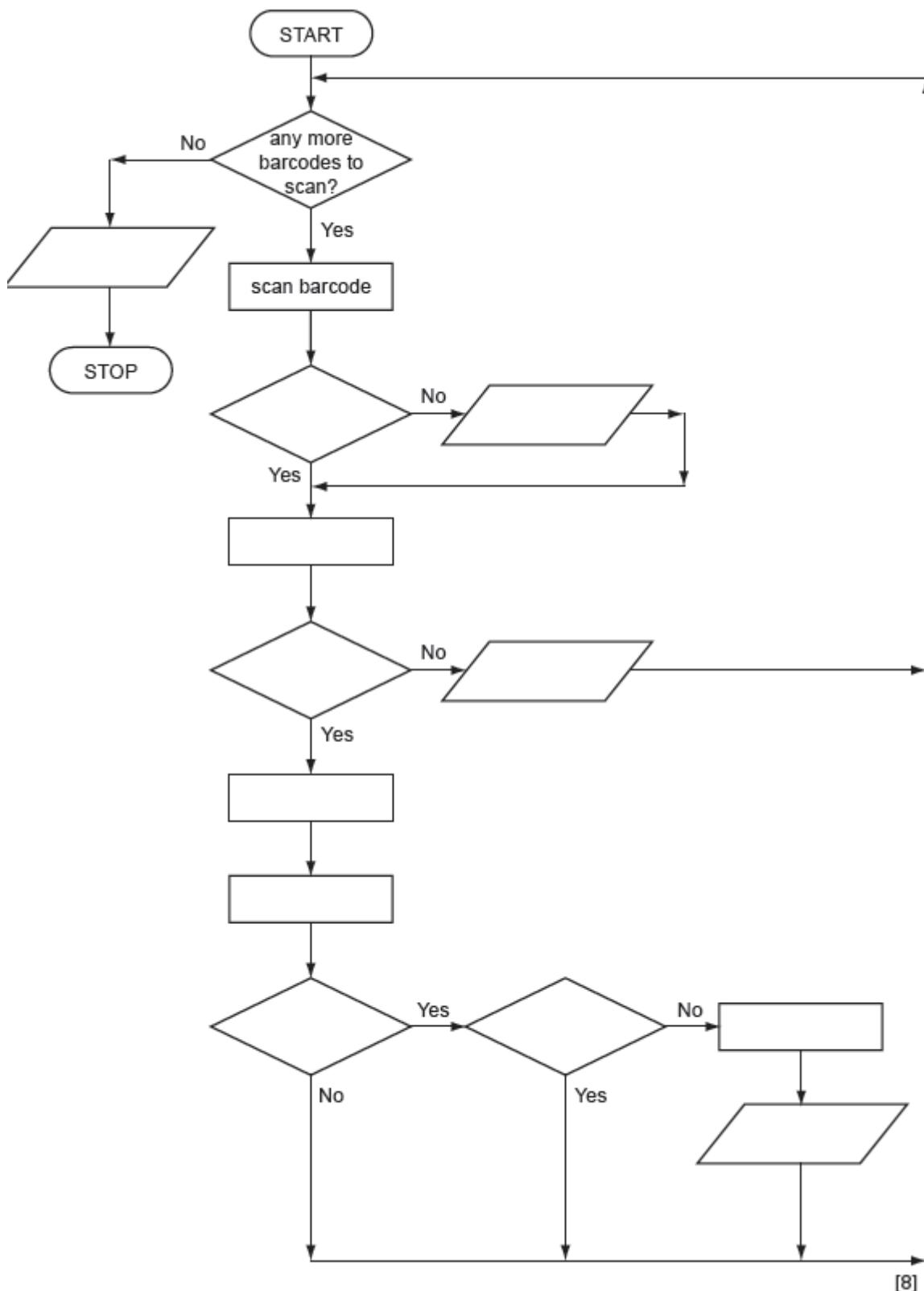
**Zak**  
ZAFAR ALI KHAN

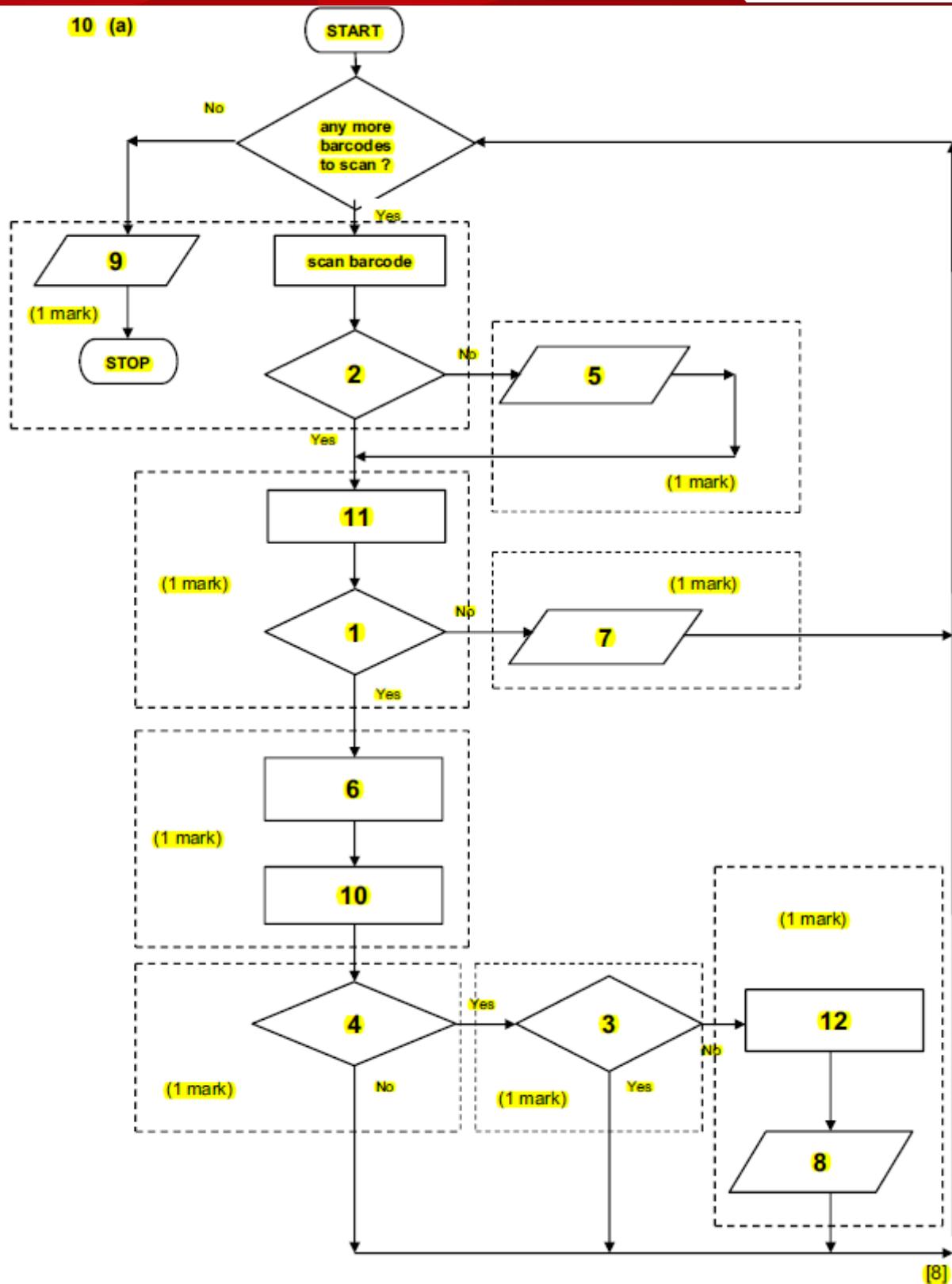
- Q21. The flowchart on the next page shows how barcodes are used in a supermarket to find product information and to produce orders for new stock automatically. Several statements are missing from the flowchart.

Complete the flowchart, using item numbers **only** from the list below.

Item number	Description
1	is barcode found?
2	is barcode read?
3	is flag for this product = 1?
4	is number in stock <= re-order value?
5	key in the barcode manually
6	locate price and product information from file
7	output an error message
8	output order request for new stock
9	output receipt and itemised bill
10	reduce number in stock by 1 and write new value back to the record
11	search database for barcode
12	set flag for this product to 1







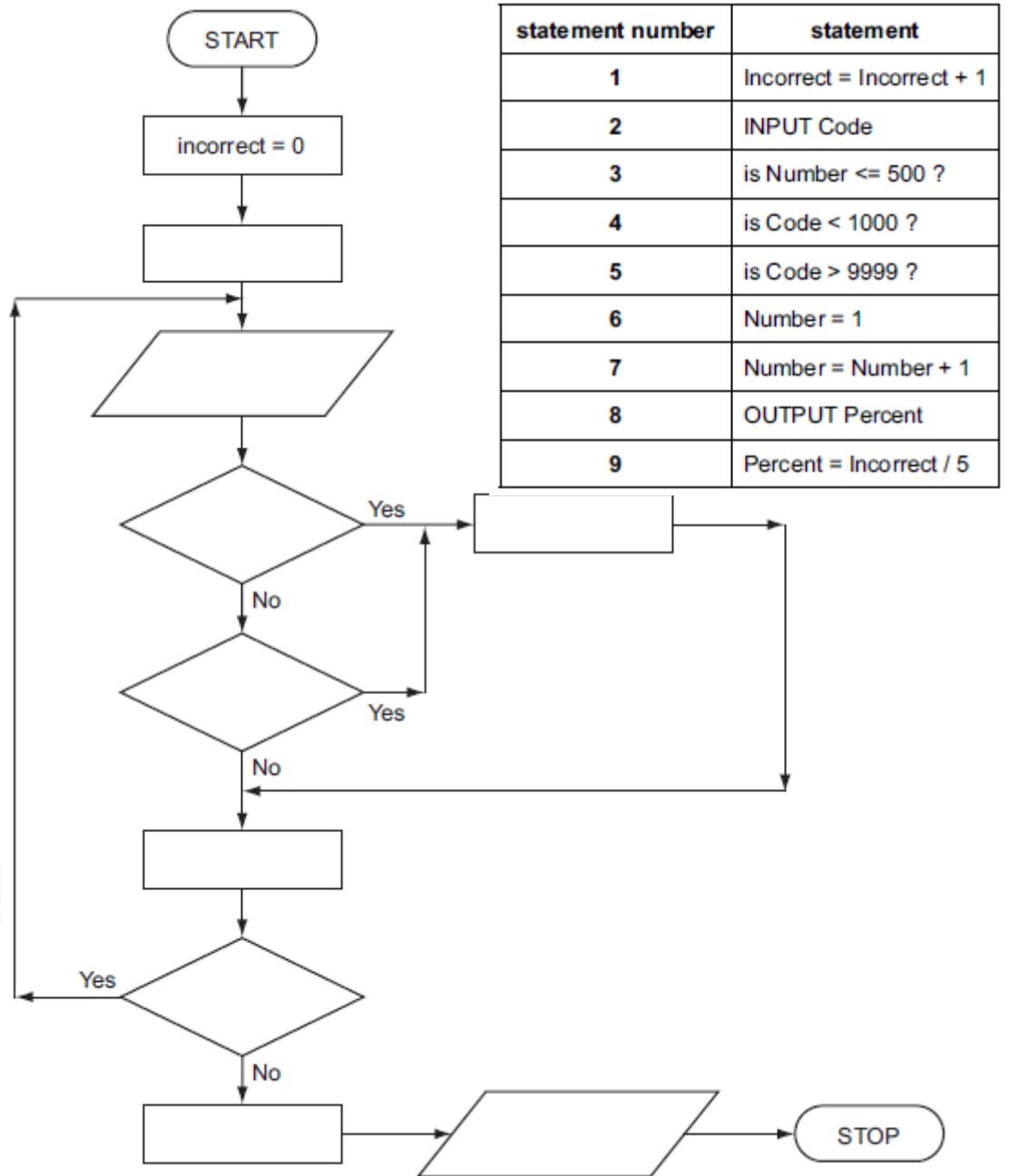


- Q22. An algorithm has been written to check that code numbers are valid on input. They must be in the range 1000 to 9999.

Five hundred codes are being entered and the percentage of entered codes which are incorrect is output.

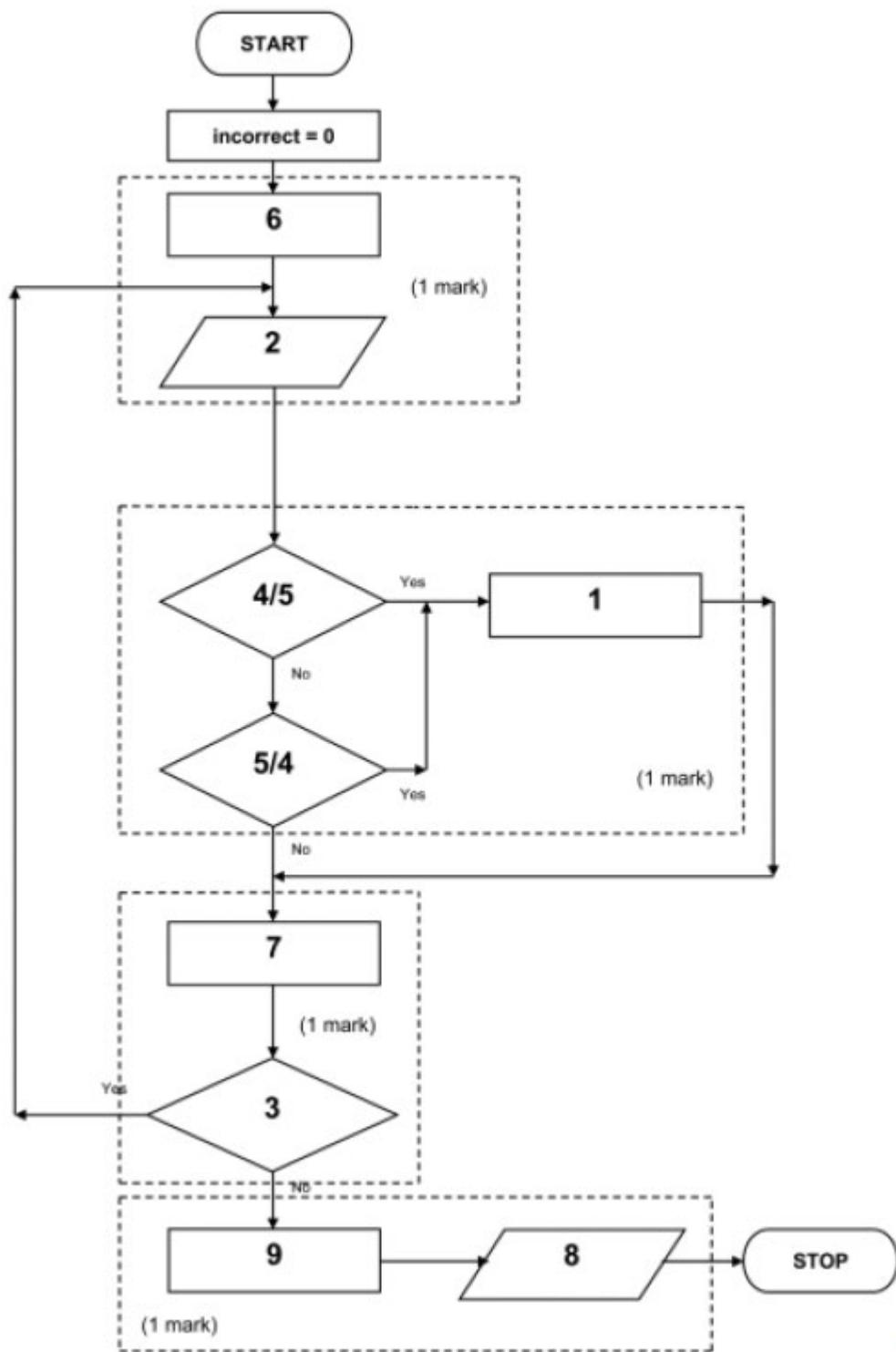
There is a flowchart on the opposite page. It has some statements missing.

Complete the flowchart. Use statement numbers only, chosen from the list below.



[4]





[4]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q23 (a) A formula for calculating the body mass index (BMI) is:

$$\text{BMI} = \frac{\text{weight in kilograms}}{(\text{height in metres}) \times (\text{height in metres})}$$

Calculate the BMI for a person whose weight is 80kg and height is 2 metres. [1]

(b) Using pseudocode or otherwise, write an algorithm that will input the ID, weight (kg) and height (m) of 30 students, calculate their body mass index (BMI) and output their ID, BMI and a comment as follows:

A BMI greater than 25 will get the comment 'OVER WEIGHT', a BMI between 25 and 19 (inclusive) will get 'NORMAL' and a BMI less than 19 will get 'UNDER WEIGHT'. [6]

(a) Award one mark

20

[1]

(b) Award one mark for each correct step in the algorithm

Initialise	one mark
Loop (30)	one mark
Input ID, weight, height	one mark
IF.....THEN.....ELSE (or CASE OF.....OTHERWISE)	three marks
Calculate BMI	one mark
Output ID, BMI and comment	one mark

[6]

Q24 Temperatures ( $^{\circ}\text{C}$ ) are being collected in an experiment every hour over a 200 hour period. Write an algorithm, using pseudocode or otherwise, which inputs each temperature and outputs

- how many of the temperatures were above  $20^{\circ}\text{C}$
- how many of the temperatures were below  $10^{\circ}\text{C}$
- the lowest temperature that was input

[5]

Sample program:

```
count = 0
total1 = 0
total2 = 0
lowest = 1000
while count < 200 do
    input temp
    if temp < 10 then total1 = total1+1
    if temp > 20 then total2 = total2+1
    if temp < lowest then lowest = temp
    count = count + 1
endwhile
output total1, total2, lowest
```

1 mark  
1 mark

1 mark

(max of 5 marks)





Q25. A company has 5000 CDs, DVDs, videos and books in stock. Each item has a unique 5-digit code with the first digit identifying the type of item, i.e.

- 1 = CD
- 2 = DVD
- 3 = video
- 4 = book

For example, for the code 15642 the 1 identifies that it is a CD, and for the code 30055 the 3 identifies that it is a video.

Write an algorithm, using pseudocode or otherwise, that

- Inputs the codes for all 5000 items
- Validates the input code
- Calculates how many CDs, DVDs, videos and books are in stock
- Outputs the four totals.

[5]

### General marking points:

loop – 1 mark  
input in correct place – 1 mark  
checks on code – 1 mark  
correct use of if/then/else or case statements – 1 mark  
increment all totals – 1 mark  
error recognition/validation – 1 mark  
correct output in correct place – 1 mark

[5]

### Sample program 1:

```
set c, d, v, b = 0: set count = 0
repeat
    input code
    x = code/10000
    y = INT(x)
    if y = 1 then c = c + 1
        else if y = 2 then d = d + 1
        else if y = 3 then v = v + 1
        else if y = 4 then b = b + 1
        else print "error"
    count = count + 1
until count = 5000
print c, d, v, b
```

1 mark  
1 mark  
1 mark  
1 mark  
2 marks  
1 mark  
1 mark



# Computer Science 2210 (P2)

ZAK's Recommended Question Bank for  
CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

## Sample program 2:

```
set c, d, v, b = 0: set count = 0
repeat
    input code
    if code >= 1000 and code < 2000 then c = c + 1
    else if code >= 2000 and code < 3000 then d = d + 1
    else if code >= 3000 and code < 4000 then v = v + 1
    else if code >= 4000 and code < 5000 then b = b + 1
        else print "error"
    count = count + 1
until count = 5000
print c, d, v, b
```

1 mark

1 mark

3 marks

1 mark

1 mark

(NOTE – OK to use statements such as *if code begins with a 1* as code checks)



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q26. (a) A car's speed is measured between points A and B, which are 200 km apart.



The final speed of the car is calculated using the formula:

$$\text{Final Speed} = \frac{200}{\text{Time (hours)}}$$

What is the final speed of a car if it takes 2 hours to get from A to B?

[1]

(b) Write an algorithm, using pseudocode or otherwise, which inputs the times for 500 cars, calculates the final speed of each car using the formula in part (a), and then outputs:

- the final speed for ALL 500 cars
- the slowest (lowest) final speed
- the fastest (highest) final speed
- the average final speed for all the cars.

[6]

(a) 100 (km/hr)

[1]

(b) Marking points

Initialisation (slowest = 1000 or an equivalent high value)  
Correct loops structure and control  
Input (in correct place)  
Calculation of final speed using given formula in part (a) inside the loop  
Output the final speed for ALL cars inside the loop  
Calculation highest speed input  
Calculation slowest speed input  
Calculate the average (two parts to this calculation)  
Final outputs (correct place + some form of processing done)

[6]

Sample program:

```
total = 0
highest = 0
slowest = 1000
for n = 1 to 500
    input time
    finalspeed = 200/time
    print finalspeed
    total = total + finalspeed
    if finalspeed > highest
        then highest = finalspeed
    if finalspeed < slowest
        then slowest = finalspeed
next n
average = total/500
print average, highest, slowest
```

}  
} 1 mark  
}



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q27. (a) Write an algorithm, using pseudocode or a flowchart, which:

- inputs 50 numbers
- outputs how many of the numbers were > 100

[3]

(b) Write an algorithm, using pseudocode or a flowchart, which:

- inputs 100 numbers
- finds the average of the input numbers
- outputs the average

[3]

(a) total = 0 (1 mark) initialisation  
for x = 1 to 50 (1 mark) correct loop  
input number (1 mark) correct input and output  
if number > 100 then total = total + 1 (1 mark)  
count numbers>100

next x

output total

(1 mark for initialising total)

(1 mark for correct loop – accept repeat loop or a while loop)

(1 mark for correct input (within loop) and output (after the loop))

(1 mark for counting how many input numbers were > 100)

[3]

(b) total = 0 (1 mark) initialise total  
for x = 1 to 100 (1 mark) correct loop  
input number (1 mark) correct input and output  
total = total + number (1 mark) finding sum of numbers  
next x  
average = total/100 (1 mark) calculate average  
output average  
(1 mark for initialising total)  
(1 mark for correct loop – accept repeat loop or a while loop)  
(1 mark for correct input (inside the loop) and output (after the loop))  
(1 mark for calculating total)  
(1 mark for calculating the average outside the loop)

[3]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q28. (a) Write an algorithm, using pseudocode or a flowchart, which

- inputs a set of positive numbers (which end with -1)
- outputs the average (mean) value of the input numbers
- outputs the value of the largest (highest) number input

[4]

(b) Write an algorithm, using pseudocode or a flowchart, which

- inputs a whole number (which is > 0)
- calculates the number of digits in the number
- outputs the number of digits and the original number  
(E.g. 147 would give an output of 3, 147)

[4]

**(a)** highest = -100; total = 0; count = 0      (1 mark)      initialise values NB highest cannot be 0  
input number      (1 mark)      inputs in the correct place  
while number < > -1 do      (1 mark)      loop until -1 is input  
total = total + number      (1 mark)      calculate number total  
count = count + 1      (1 mark)      and count numbers input  
if number > highest then highest = number      (1 mark)      highest  
input number  
endwhile  
average = total/count      (1 mark)      calculate average value  
print average, highest      (1 mark)      and output average and highest value

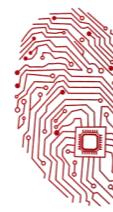
[4]

**(b)** d = 0      (1 mark)      initialise value  
input number      (1 mark)      input number and set variable  
t = number  
repeat      (1 mark)      to this number  
    t = t / 10      (1 mark)      correct loop  
    d = d + 1      (1 mark)      \*\*method to find number of digits  
until t < 1  
print number, d      (1 mark)      \*\*counting number of digits  
(\*\* NOTE: there are other ways of finding number of digits e.g.  
    if number > 0 then d = 1  
    else if number > 9 then d = 2  
    .....  
    else if number > 999999 then d = 7 etc.)

If no loop then 0 for loop and 0 for output

[4]





Q29. (a) Write an algorithm, using pseudocode or flowchart only, which:

- inputs three numbers
- outputs the largest of the three numbers

(b) Write an algorithm, using pseudocode or flowchart only, which:

- inputs 1000 numbers
  - outputs how many of these numbers were whole numbers (integers)
- (You may use INT(X) in your answer e.g. Y = INT(3.8) gives the value Y = 3)

**(a) marking points:**

the way to find and print the largest value a	1 mark
the way to find and print the largest value b	1 mark
the way to find and print the largest value c	1 mark

**sample algorithm:**

```
input a, b, c
if a > b and a > c then print a
else if b > c then print b
else print c
```

(1 mark)  
(1 mark)  
(1 mark)

[3]

**(b) marking points:**

loop construct	1 mark
check if number is an integer	1 mark
counting the number of integers input	1 mark
output count value (outside the loop)	1 mark

**sample algorithm:**

```
for x = 1 to 1000
    input number
    difference = INT(number) – number
    if difference = 0 then total = total + 1
next x
print total
```

(1 mark)  
(1 mark)  
(1 mark)

(NOTE: alternative to lines 3 and 4:  
if INT(number) = number then total = total + 1 (2 marks) )

[4]





- Q30. The weather conditions in a town are being monitored over a year (365 days). The values recorded per day are weather type and temperature (e.g. CLOUDY, 25). Write an algorithm, using pseudocode or flowchart only, which:
- inputs the weather type and temperature for each day
  - outputs the number of days that were CLOUDY, RAINING, SUNNY or FOGGY
  - outputs the highest recorded temperature for the year
  - outputs the lowest recorded temperature for the year

**Marking points**

initialise variables	1 mark
correct loop control	1 mark
input (in correct place)	1 mark
correct check on type of weather (if, case, etc.)	1 mark
adding number of days of each type of weather	1 mark
check for the highest temperature	1 mark
check for the lowest temperature	1 mark
output (all items in the correct place)	1 mark

**Sample algorithm**

```

c = 0: r = 0: s = 0: f = 0
high = 0 (or a negative number)
low = 1000
for x = 1 to 365
    input weather, temp
    if weather = "CLOUDY" then c = c + 1
        else if weather = "RAINING" then r = r + 1
            else if weather = "SUNNY" then s = s + 1
                else if weather = "FOGGY" then f = f + 1
    endif
    if temp > high then high = temp
    if temp < low then low = temp
next x
print c, r, s, f, high, low

```

(1 mark)  
[6]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q31. (a) Write an algorithm, using pseudocode or a program flowchart only, that:

- inputs a series of positive numbers (-1 is used to terminate the input),
- outputs how many numbers were less than 1000 and
- outputs how many numbers were greater than 1000.

[4]

(b) Write an algorithm, using pseudocode or a program flowchart only, that

- inputs fifty numbers each as 4 separate digits, for example: 1 5 4 1
- outputs the percentage of numbers that were palindromes.

(note: a palindrome reads the same way backwards or forwards. For example, 1331 is a palindrome but 1541 is not).

Use separate variables to store the separate digits of a number (for example D1, D2, D3, D4). [4]

### (a) sample program:

```
x = 0: y = 0 (1 mark)
input number (1 mark)
while number < > -1 do (1 mark)
    if number > 1000 then x = x + 1 (1 mark)
    else if number < 1000 then y = y + 1 (1 mark)
    input number
endwhile
print x, y (1 mark)
```

### marking points:

- initialisation of variables
- first and subsequent inputs in the correct place
- correct loop control (only repeat or while loops work here)
- check if number > 1000 and increment total
- check if number < 1000 and increment total
- output totals outside the loop

[4]

### (b) sample program

```
T = 0
for N = 1 to 50 (1 mark)
    read D1, D2, D3, D4 (1 mark)
    if D1 = D4 and D2 = D3 then T = T+1 (2 marks)
next N
percent = T * 2 }
print percent (1 mark)
```

### marking points

- correct loop (for, repeat or while loops all work)
- correct input
- check whether D1 = D4 and D2 = D3
- summation if D1 = D4 and D2 = D3
- calculate percentage and output the value outside the loop

[4]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q32. 5000 numbers are being input which should have either 1 digit (e.g. 5), 2 digits (e.g. 36), 3 digits (e.g. 149) or 4 digits (e.g. 8567).

Write an algorithm, using pseudocode or flowchart only, which

- inputs 5000 numbers
- outputs how many numbers had 1 digit, 2 digits, 3 digits and 4 digits
- outputs the % of numbers input which were outside the range

[6]

**15 marking points:**

- initialisation	1 mark
- correct loop structure (1 to 5000)	1 mark
- input numbers (INSIDE a loop)	1 mark
- test for how many digits in all input numbers	1 mark
- increment all relevant totals	1 mark
- increment error total as appropriate	1 mark
- calculate % errors in input numbers	1 mark
- output ALL four totals + percent value (OUTSIDE a loop)	1 mark

**sample coding:**

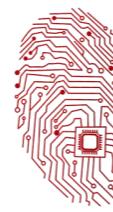
```
single = 0: two = 0: three = 0: four = 0: error = 0           1 mark
for x = 1 to 5000                                         1 mark
    input number                                         1 mark
    if number > 999 and number < 10000 then four = four + 1 }   1 mark
        else if number > 99 then three = three + 1 }           2 marks
        else if number > 9 then two = two + 1 }                 marks
        else if number > 0 then single = single + 1 }           1 mark
    else error = error + 1                                     1 mark
next x
percent = error/50                                         1 mark
print single, two, three, four, percent                      1 mark
```

[6]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q33. (a) Write an algorithm, using pseudocode or flowchart only, which:

- inputs three numbers
- outputs the largest of the three numbers

[3]

sample algorithm:

INPUT a, b, c

IF a > b AND a > c THEN PRINT a

(1 mark)

ELSE IF b > c THEN PRINT b

(1 mark)

ELSE PRINT c

(1 mark)

(b) Write an algorithm, using pseudocode or flowchart only, which:

- inputs 1000 numbers
- outputs how many of these numbers were whole numbers (integers)

(You may use INT(x) in your answer, e.g. y = INT(3.8) gives the value y = 3)

sample algorithm:

FOR x ← 1 TO 1000

(1 mark)

INPUT Number

Difference ← INT(number) - Number

(1 mark)

IF Difference = 0 THEN Total ← Total + 1

(1 mark)

NEXT x

PRINT total

(1 mark)

(NOTE: alternative to lines 3 and 4:

IF INT(Number) = Number THEN Total ← Total + 1 (2 marks)

(c) Describe, with examples, two sets of test data you would use to test your algorithm.

[2]

**(c)** Description of any **two** sets of test data. Many correct answers, these are examples only.

1000 whole numbers to ensure that loop works properly

900 whole numbers and 100 numbers with decimal places to ensure that the routine distinguishes correctly

[2]





Q34. A group of students were monitoring the temperature every day over a one-year period. Readings were taken ten times every day (you may assume a year contains 365 days).

Write an algorithm, using pseudocode or flowchart, which

- inputs all the temperatures (ten per day)
- outputs the highest temperature taken over the year
- outputs the lowest temperature taken over the year
- outputs the average temperature per day
- outputs the average temperature for the whole year

[7]

**Marking points (maximum of 7 marks)**

- initialising highest and lowest to reasonable values (must not be zero)
- first loop controlling one year (365 days)
- re-setting total for each day
- second loop controlling readings taken per day
- read temperature
- calculate total day temperature
- calculate total year temperature
- identifying highest temperature
- identifying lowest temperature
- finding average temperature for day
- finding average temperature for year
- output average day temperature inside loop
- output highest, lowest, average outside the loop



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

### Sample algorithm in pseudocode

```
highest = -100: lowest = 100: total_year = 0 } 1 mark
for c = 1 to 365 } 1 mark
    total_day = 0 } 1 mark
    for d = 1 to 10 } 1 mark
        read temp } 1 mark
        total_day = total_day + temp } mark
        total_year = total_year + temp } 1 mark
        if temp > highest then highest = temp } 1 mark
        if temp < lowest then lowest = temp } 1 mark
    next d
    average_day = total_day/10 } 1 mark
    print average_day } 1 mark
next c
average_year = total_year/3650 } 1 mark
print highest, lowest, average_year } 1 mark
```

[7]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q35. Ahmed, a designer, stores the following details of each job that he does in a file.

- job ID (a whole number between 1 and 1000 inclusive)
- job description
- price (greater than \$10 and not more than \$5000)
- expected completion date
- paid (yes/no)

(a) Complete the following table.

Variable Name	Data Type	Validation Check	Example data
JobID			
JobDescription			
Price			
ExpectedCompletionDate			
Paid			

Q36. Amber stores the names of her favourite song tracks in an array. She has 56 track names at the moment and expects to reach 150. She defined the array as one-dimensional, size 150 and will store strings. She then initialised each element of the array.

As her collection grows, Amber decides to hold more information about each track. The data for each track is structured as a record.

Each record contains the following data:

- unique track ID (a whole number between 1 and 150)
- track name
- date bought
- cost
- solo artist (yes/no)

Complete the following table.

Variable Name	Data Type	Validation Check	Example data
TrackID			
TrackBought			
Cost			
SoloArtist			



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q37. TOTAL = 10  
REPEAT  
    READ K  
    IF K >= 2 THEN  
        TOTAL = TOTAL + K  
    ELSE  
        K= K\* K  
        TOTAL = TOTAL + K  
    ENDIF  
    PRINT TOTAL  
UNTIL K= 2  
PRINT TOTAL  
END

Write down the output produced by this code with the following input test data.

3, 5, 1, 2, 4, 0

Q38. D=1  
INPUT E  
B=E  
C=E  
FOR I = 1 TO 3  
    INPUT A  
    IF A>B THEN B = A  
    ELSE IF A < C THEN C = A  
    ENDIF  
    END IF  
    D = D + 1  
    E = E + A  
NEXT  
F = E/D  
OUTPUT B, C, F  
END

(a) State the output values of B, C and F for the following input test data

6, 3, 7, 0

[3]



03-111-222-ZAK



OlevelComputer  
AlevelComputer



@zakonweb



zak@zakonweb.com



www.zakonweb.com

# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q39. Jodelle first produces her solution using pseudocode. She wants the password to be 'poppy', the name of her cat.

```
Attempt ← 1
REPEAT
    INPUT Password
    Attempt ← Attempt +1
UNTIL Password = "poppy" OR Attempt = 3
IF Password = "poppy"
    THEN
        OUTPUT "password correct"
    ELSE
        OUTPUT "no valid password entered"
ENDIF
```

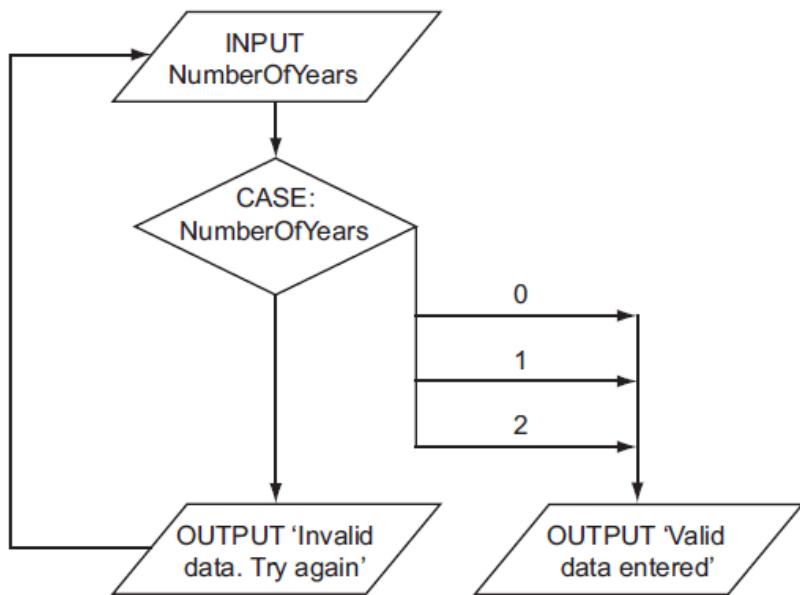
- Q40. Complete the final row of the trace table for this pseudocode using poppy as input.

Attempt	Password	Password = "poppy"	Attempt = 3	Password = "poppy" OR Attempt = 3	Output
1					
	poppy				
2					
		True			
			False		
				True	

[1]

- Q41. (c) Complete the trace table for this pseudocode code using cat as first input, followed by poppy as second input.

- Q42. Ahmed is writing a program to record the data of members of the school football squad. The input data will be validated. One input is the number of years a member has played for the team. This will be 0, 1 or 2. The flowchart for the validation of number of years is shown below.



- (c) The three basic programming constructs used to control the flow of information are:  
sequence, selection and iteration.  
State the two constructs that are used in your code. [1]

(d) Describe what is meant by iteration. [2]





Q43. Philipe is trying different ways of designing the process of entering data into an array.

He declares a variable called ArraySize and sets it to 3.

He declares an array Number[ArraySize].

He then writes the following pseudocode.

```
Element ← 1
WHILE Element < ArraySize DO
    INPUT Number[Element]
    Element ← Element + 1
ENDWHILE
```

- (a) In the following table trace the effect of entering 24, 57, 12.

ArraySize	Element	Element < ArraySize	Number		
			[1]	[2]	[3]
3					
	1				
		true			

[5]

- (c) Philipe is not convinced that a WHILE loop was the best choice for this pseudocode.  
Instead he considers using a REPEAT...UNTIL loop.  
Rewrite the corrected pseudocode using a REPEAT...UNTIL loop.

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q44. A database was set up to show the properties of certain chemical elements. Part of the database is shown below.

Name of element	Element symbol	Atomic number	Atomic weight	Melting point (C)	Boiling point (C)	State at room temp
oxygen	O	8	16	-218	-183	gas
iron	Fe	26	56	1538	2861	solid
mercury	Hg	80	201	-38	356	liquid
bromine	Br	35	80	-7	59	liquid
osmium	Os	76	190	3033	5012	solid
caesium	Cs	55	133	28	671	solid
gallium	Ga	31	70	30	2204	solid
argon	Ar	18	40	-189	-186	gas
silver	Ag	47	108	961	2162	solid

(a) How many fields are in each record? [1]

(b) The following search condition was entered:

(Melting point (C) < 40) AND (Atomic weight > 100)

Using Element symbol only, which records would be output? [2]

(c) Which field would be best suited as primary key? [1]

(a) 7 [1]

(b) Hg, Cs [2]

(c) Element symbol [1]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q45. A database was set up showing statistics for some states in the USA. Part of the database is shown below.

Ref	Name of state	Population (millions)	Number of houses (millions)	Area (sq miles)	Density	Travel time to work (min)
OR	Oregon	3.8	1.6	96000	39.6	22.3
CO	Colorado	4.9	2.1	104000	47.1	24.3
NJ	New Jersey	8.7	3.5	7400	1175.7	30.0
TX	Texas	24.3	9.4	262000	92.7	25.4
CA	California	36.8	13.3	156000	235.9	27.7
FL	Florida	18.3	8.7	53900	339.5	26.2
AK	Alaska	0.7	0.3	572000	1.2	19.6
NV	Nevada	2.6	1.1	110000	23.6	23.3
NY	New York	19.5	7.9	47000	414.9	31.7

- (a) (i) How many records are in this section of the database? [1]  
(ii) How many fields are in each record? [1]

- (a) (i) 9 [1]  
(ii) 7 [1]

- (b) The following search condition was entered:  
(Population (millions) < 4.0) OR (Number of houses (millions) < 4.0)  
Using Ref only, write down which records will be found. [2]

- (b) OR, CO, NJ, AK, NV  
(-1 mark for each error: i.e. each omission, each incorrect additional item) [2]

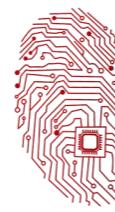
- (c) Write down the search condition to find out which states have an area over 100 000 square miles and where it takes less than 25 minutes to get to work. [2]

- (c) (Area(sq miles) > 100 000) AND (Travel time to work (min) < 25)  
<----- 1 mark -----> <----- 1 mark ----->  
Or  
(Travel time to work (min) < 25) AND (Area(sq miles) > 100 000)  
<----- 1 mark -----> <----- 1 mark -----> [2]

- (d) (i) What should be the key field in this database? [1]  
(ii) Give a reason for your choice. [1]

- (d) (i) Ref or Name of State [1]  
(ii) this is unique to for each state [1]





Q46. A database was set up to show the properties of certain chemical elements. Part of the database is shown below.

Name of element	Element Symbol	Atomic Number	Atomic Weight	Melting Point (C)	Boiling Point (C)	State at room temp
oxygen	O	8	16	- 218	- 183	gas
iron	Fe	26	56	1538	2861	solid
mercury	Hg	80	201	- 38	356	liquid
bromine	Br	35	80	- 7	59	liquid
osmium	Os	76	190	3033	5012	solid
caesium	Cs	55	133	28	671	solid
gallium	Ga	31	70	30	2204	solid
argon	Ar	18	40	- 189	- 186	gas
silver	Ag	47	108	961	2162	solid

(a) How many fields are in each record?

(a) 7

[1]

(b) The following search condition was entered:

(Melting Point (C) < 40) AND (Atomic Weight > 100)

Using Element Symbol only, which records would be output?

(b) Hg, Cs

(1) (1) Correct Answer Only

[2]

(c) We need to know which elements have an atomic number greater than 50 and are solid at room temperature.

Write down the search condition to find out these elements.

(c) (Atomic Number > 50) AND (State at room temp = "solid")

< ----- 1 mark -----> < ----- 1 mark ----->

Or

(State at room temp = "solid") AND (Atomic Number > 50)

< ----- 1 mark -----> < ----- 1 mark ----->

Must use exact spelling

[2]

(d) The data are to be sorted in descending order of Boiling Point (C).

Write down the new order of records using the Element Symbol only.

(d) Os, Fe, Ga, Ag, Cs, Hg, Br, O, Ar

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q47. A database was set up showing the largest ocean-going liners. Part of the database is shown below.

Liner ID	Year built	Gross Tonnage	Country of Registration	Country of Construction
OA	2009	225282	Norway	Finland
IN	2008	154407	Norway	Finland
QM	2004	148528	UK	France
EX	2000	137308	Norway	Finland
VO	1999	137276	Norway	Finland
GP	1997	108865	UK	Italy
DE	1996	101509	USA	Italy
SP	1995	77499	UK	Italy
SO	1988	73192	Norway	France
FR	1972	66343	France	France
QE	1940	86673	UK	UK
NO	1935	79280	France	France
MJ	1922	56561	UK	Germany
TI	1912	46329	UK	UK
MA	1907	31938	UK	UK

(a) How many records are shown in the above part?

(a) 15 records

[1]

(b) Using Liner ID only, what would be output if the following search condition was typed in: (Year built < 2000) AND (Country of Registration = Country of Construction)?

(b) FR, QE, NO, TI, MA

(-1 mark for each error or omission)

[2]

(c) Write the search condition to find out which liners have a gross tonnage larger than 80 000 or are registered in the UK.

(c) (Gross Tonnage > 80 000) OR (Country of Registration = "UK")

<----- 1mark -----> <----- 1 mark ----->

or

(Country of Registration = "UK") OR (Gross Tonnage > 80 000)

<----- 1mark -----> <----- 1 mark ----->

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q48. A database showing the population of world cities has been produced. A section of the database is shown below.

Ref No	Name of City	Country	Area	City Population (m)	Urban Population (m)	Capital
1	Tokyo	Japan	Asia	33.2	34.1	Yes
2	New York	USA	America	17.8	21.9	No
3	Sao Paulo	Brazil	America	17.7	20.2	No
4	Seoul	S Korea	Asia	17.5	22.3	Yes
5	Mexico City	Mexico	America	17.4	22.7	Yes
6	Osaka	Japan	Asia	16.4	16.8	No
7	Manila	Philippines	Asia	14.8	14.9	Yes
8	Mumbai	India	Asia	14.4	19.7	No
9	Jakarta	Indonesia	Asia	14.3	17.2	Yes
10	Calcutta	India	Asia	12.7	15.6	No

- (a) How many records are shown above?

(a) 10

[1]

- (b) Using Ref No only, which records would be found if the following search condition was typed in

(Country = "India" OR Area = "America") AND (Capital = "No")

(b) 2, 3, 8, 10

1 mark per two correct records

Loose 1 mark for each additional record

[2]

- (c) Write a search condition to find the cities in Asia with a city population greater than 17 million OR an urban population greater than 20 million.

(c) (Area = "Asia") AND (City Population(m) > 17 OR Urban Population(m) > 20)

<---- 1 mark -----> <----- 1 mark ----->

OR

(Area = "Asia" AND City Population(m) > 17) OR (Area = "Asia" AND Urban Population(m) > 20)

<----- 1 mark -----> <----- 1 mark ----->

[2]

- (d) Give one advantage of using Y or N rather than Yes or No in the Capital column.

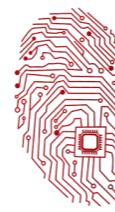
(d) Any one advantage from:

- less likely for entry/typing errors
- uses less memory to store records
- faster data entry



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q49. An airport has a number of hotels nearby. A database has been set up to give customers information to allow them to select a hotel.

Hotel Ref	Name of hotel	No. of stars	No. of rooms	Hotel parking	Price per person (\$)	Distance from airport (km)
H41	The Grand	3	45	Y	65	11
K22	Sleepy Inn	2	15	N	45	10
N15	Britannia	5	140	Y	150	4
L44	Beach Hotel	4	62	N	85	8
H30	Sea View	3	38	N	60	4
H21	Pyramid	3	25	N	70	5
N21	Superior	5	120	Y	200	2
K14	Travellers	2	15	N	45	10

(a) How many records are shown in the database?

(a) 8

[1]

(b) Which field in each record must be unique?

(b) Hotel Ref

[1]

(c) The following search condition was typed in:

(No. of stars > 3) OR (Hotel parking = Y)

Using Hotel Ref only, which records would be found?

(c) H41, N15, L44, N21 (-1 for each error or omission)

[2]

(d) Write down the search condition to find which hotels were less than 10 km from the airport and charged under \$100 per person.

(d) (Distance from airport (km) < 10) AND (Price per person(\$) < 100)

←----- 1 mark -----→ ←----- 1 mark -----→

OR

(Price per person(\$) < 100) AND (Distance from airport (km) < 10)

←----- 1 mark -----→ ←----- 1 mark -----→

[2]

(e) The database was sorted into descending order using No. of rooms.

Using Hotel Ref only, write down the sorted order of records.

(e) N15, N21, L44, H41, H30, H21, K22, K14

↑  
(last 2 in any order)

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

- Q50. A school Science department is going to use a database to record details about its equipment.

(a) Give two advantages of using a computer system rather than a manual filing system.

- (a) Any two advantages from:  
easier to know when to re-order  
automatic re-ordering  
easier/faster to update  
easier/faster to access information  
more up to date stock levels  
fewer mistakes  
takes up less storage space

[2]

(b) Part of the database is shown below:

Equipment	Code No	Quantity in Stock	Need to re-order?	Supplier Name	Price (\$)	Stock Value (\$)
Beaker	01043	25	Y	Labquip	1.04	26.00
Test tube	01051	200	N	Labquip	0.40	80.00
Clamp stand	01065	51	N	Anglera	3.25	165.75
Tongs	01151	23	Y	Anglera	0.55	12.65
Spatula	01222	62	N	Anglera	0.66	40.92
Flask	01341	15	Y	Labquip	1.70	27.50

(i) As data is entered it needs to be verified. Describe one way this could be done.

- (b) (i) Any one from:  
double entry  
visual check/comparison with original

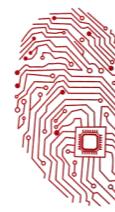
[1]

(ii) Data also needs to be validated. Using fields from the database as examples, describe two different validation checks which could be performed on the data.

- (ii) Any two checks from (accept examples):  
(two different checks must be given but the same field can be given twice)  
equipment - character check, length check  
code - length check, character check, check digit  
quantity - range check, character check  
need to re-order - character check, length check, Boolean check  
supplier name - character check, length check  
price - format check, range check  
stock value - range check, character check

[2]





Q51. A hospital holds records of its patients in a database. Four of the fields are:

- date of visit (dd/mm/yyyy)
- patient's height (m)
- 8-digit patient ID
- contact telephone number

The presence check is one possible type of validation check on the data. For each field, give another validation check that can be performed. Give an example of data which would fail your named validation check.

A different validation check needs to be given for each field.

field name	name of validation check	example of data which would fail the validation check
date of visit		
patient's height		
patient ID		
contact telephone number		



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

3 1 mark for naming validation check + 1 mark for correct matching example

field name	name of validation check	example of data which would fail validation check
<b>date of visit</b>	format check	e.g. 2012/12/04 e.g. 3rd March 2012
<b>patient's height</b>	type/character check range check limit check	can't be < 0 or > 2.5m e.g. -5, five e.g. 8, -3,
<b>patient ID</b>	type check length check range check	(can't be < 0 or > 99999999) e.g. 3142ABCD e.g. 2131451, 136498207  e.g. -3, 851341625
<b>contact telephone number</b>	length check type/character check format check	e.g. 0773141621834 e.g. 7H215GD e.g. 01223/123456/8901234

[8]



# Computer Science 2210 (P2)

ZAK's Recommended Question Bank for  
CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q52. A motor car manufacturer offers various combinations of

- seat colours
- seat materials
- car paint colours

A database was set up to help customers choose which seat and paint combinations were possible.

code	seat material			car paint colours						
	cloth	leather	seat colour	white	red	black	blue	green	silver	grey
CB	Y	N	black	Y	Y	Y	Y	Y	Y	Y
LB	N	Y	black	N	Y	N	N	N	Y	Y
CC	Y	N	cream	N	Y	Y	Y	N	N	N
LC	N	Y	cream	N	Y	Y	Y	N	N	Y
CG	Y	N	grey	N	Y	Y	Y	Y	Y	N
LG	N	Y	grey	N	Y	N	Y	N	Y	Y
CR	Y	N	red	Y	N	Y	N	N	Y	Y
LR	N	Y	red	Y	N	Y	N	N	Y	Y
CL	Y	N	lime	N	N	N	Y	N	N	N
LL	N	Y	lime	N	N	Y	Y	Y	N	N

(NOTE: N = no, not a possible combination, Y = yes, combination is possible)

(a) How many records are shown in the database?

[1]

(a) 10/ten

[1]

(b) The following search condition was entered:

(cloth = "Y") AND (blue = "Y")

Using code only, which records will be found?

[2]

(b) CB, CC, CG, CL

<- 1 mark - > <- 1 mark - >

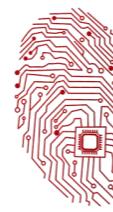
(-1 mark for each additional item)

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(c) A customer wanted to know the possible combinations for a car with leather seats and either silver or grey paint colour.

What search condition would need to be input?

[2]

- (c)  $(\text{leather} = "Y") \text{ AND } (\text{silver} = "Y" \text{ OR } \text{grey} = "Y")$   
< - 1 mark - > < ----- 1 mark ----- >  
or  
 $(\text{silver} = "Y" \text{ OR } \text{grey} = "Y") \text{ AND } (\text{leather} = "Y")$   
< ----- 1 mark ----- > < ----- 1 mark ----- >  
or  
 $(\text{leather} = "Y") \text{ AND } ((\text{silver} = "Y") \text{ OR } (\text{grey} = "Y"))$   
< - 1 mark - > < ----- 1 mark ----- >  
or  
 $((\text{silver} = "Y") \text{ OR } (\text{grey} = "Y")) \text{ AND } (\text{leather} = "Y")$   
< ----- 1 mark ----- > < ----- 1 mark ----- >

[2]

(d) A customer decided to buy a green car. He wanted to know which seat colours and seat materials were not a possible combination with green paint.

What search condition would he need to enter?

[1]

- (d)  $(\text{green} = "N")$

[1]

(e) Give one advantage of using the codes Y and N in the database rather than using Yes and No.

[1]

- (e) Any one from:

- uses up less memory (NOT space)
- faster to key in data/saves time when keying in data
- fewer mistakes made when keying in data

[1]

Q53. A car dealer uses a database to keep details of cars in stock. Part of the stock file is shown below.

RegNo	Make	Model	Colour	Doors	Engine(cc)	Price(\$)
AT 15 APC	Renault	Laguna	Black	5	1600	5800
NX 21 TPQ	Opel	Corsa	Green	3	1400	2000
WS 46 ART	VW	Golf	Blue	3	1600	3400
RP 09 NTR	VW	Golf	Red	5	2000	6350
VV 81 KKT	Proton	Wira	White	4	1300	2200
NK 55 ARM	VW	Golf	White	3	1800	4100

- (a) (i) State the fieldname that should be used as the key field.



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

(a) (i) Reg No

(ii) Explain the purpose of a key field.

(ii) unique identifier

used to search the database

used to link to other tables of data (foreign data)

[2]

(b) The following search condition is input:

(Price(\$) < 5000) AND (Model = Golf)

Write down the records that match the above search condition using only RegNo.

(b) WS 46 ART

NK 55 ARM

[2]

(c) Write down a search condition to find cars with an Engine greater than 1400cc or which have less than 5 Doors.

(c) Either (Engine (cc) > 1400) OR (Doors < 5)

Or (Doors < 5) OR (Engine (cc) > 1400)

<---- 1 mark ----><----- 1 mark ----->

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q54(a) Programs can be designed in modular form.

Discuss the advantages and disadvantages of designing programs in modular form.

- Advantages:
  - fewer bugs because each set of programming commands is shorter
  - algorithm is more easily understood
  - many programmers can be employed, one on each of the modules
  - programmers can use their expertise on particular techniques
  - testing can be more thorough on each of the modules
  - allows library programs to be inserted
  - all of which saves time and means the finished program can be completed more quickly
  
- Disadvantages:
  - can lead to problems with variable names
  - means documentation of modules must be thorough
  - can lead to problems when modules are linked because links must be thoroughly tested

(1 per -, max 4 advantages, max 5)

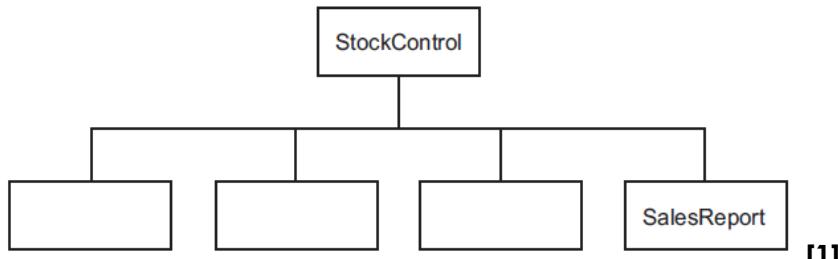
[5]

Q55(b) Nathan is designing a software solution for stock control in a computer shop. He has a colleague, called Andre, who will help him write the program. Nathan decides to modularise the solution.

- (a) State why modularisation is a good idea.  
(b) As the first step in his design he splits the solution into the following main areas:  
Initialisation, StockOrdering, Sales, SalesReport.

[1]

Complete the following structure diagram.



- (c) SalesReport is made up of two modules, MonthlySalesReport and AnnualSalesReport.

Add them to the structure diagram in (b).

[2]

(a) e.g.

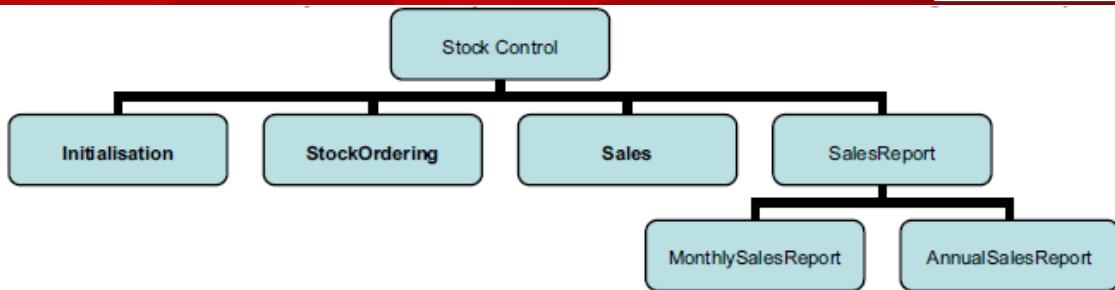
- each can work on individual modules
- modules can be written in parallel

(answer must be specific to this scenario) Max

- (b) Each box correctly labeled (Initialisation, StockOrdering, Sales) Order significant

[1]





[1]

(c) 1 mark for 2 boxes under SalesReport

1 mark for correct labelling

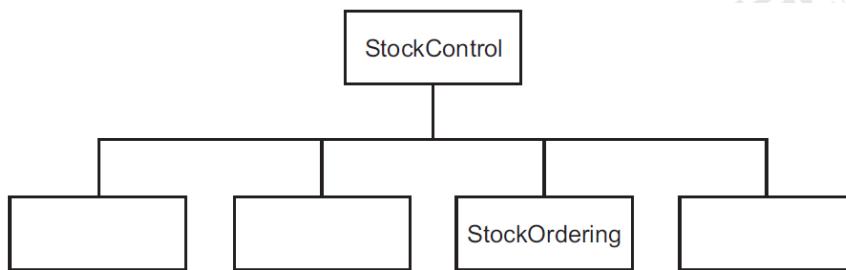
- Q56 Nathan is designing a software solution for stock control in a mobile phone shop. He has a colleague called Andre who will help him write the program. Nathan decides to modularize the solution.

[2]

(a) State why modularisation is a good idea.

(b) As the first step in his design he splits the solution into the following main areas:  
 Initialisation, PhoneSales, StockOrdering, Accounts.

Complete the following structure diagram.



[1]

(c) StockOrdering is made up of two modules, PlaceOrder and ReceiveGoods.

Add them to the structure diagram in (b).

[2]

(a) e.g.

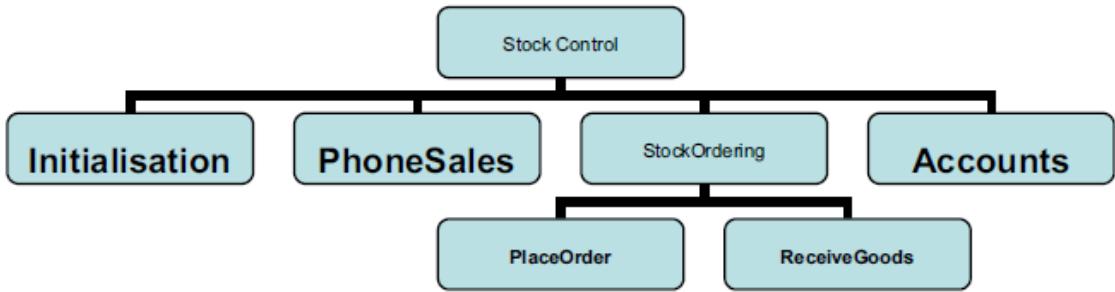
-each can work on individual modules

-modules can be written in parallel

(answer must be specific to this scenario) Max

[1]

(b) Each box correctly labelled (Initialisation, PhoneSales, Accounts) Order significant



[1]

(c) 1 mark for 2 boxes under StockOrdering

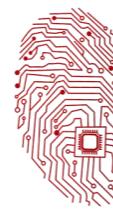
1 mark for correct labelling

[2]



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

Q57(a) What are library routines?

In higher-level computer languages, many commonly-needed routines are prepackaged as functions. Collection of Functions is sometimes called *library routines*. Few of the functions are:

MOD()

INT()

ROUND()

(b) A built in function, INT(), exists which returns the integer part of a real number.

(i) What is returned by INT(34.2)?

[1]

AvMark may be a decimal number such as 79.7 or 34.2. Meena wants the answer rounded to the nearest whole number.

A variable, Rounded, is assigned the result of using the INT routine with parameter (AvMark + 0.5).

(ii) What is the value of Rounded when AvMark is 79.5?

[1]

(h) (i) 34 [1]

(ii) 80 [1]

(c) What are few validation checks? Give example of each?

Validation is a check on DATA INPUT to the system by comparing the data input with a set of rules that the computer has been told the data must follow. If the data does not match up with the rules then there must be an error. There are many different types of validation check that can be used to check input in different applications.

1. Range check. A mathematics exam is out of 100. A simple validation rule that the computer can apply to any data that is input is that the mark must be between 0 and 100 inclusive. Consequently, a mark of 101 would be rejected by this check as being outside the acceptable range.

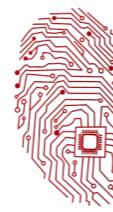
2. Character check. A person's name will consist of letters of the alphabet and sometimes a hyphen or apostrophe. This rule can be applied to input of a person's name so that dav2d will immediately be rejected as unacceptable.

3. Format check. A particular application is set up to accept a national insurance number. Each person has a unique national insurance number, but they all have the same format of characters, 2 letters followed by 6 digits followed by a single letter. If the computer knows this rule then it knows what the format of a NI number is and would reject ABC12345Z because it is in the wrong format, it breaks the rule.



# Computer Science 2210 (P2)

## ZAK's Recommended Question Bank for CAIE M/J 2019.



**Zak**  
ZAFAR ALI KHAN

4. Length check. A NI number has 9 characters, if more or fewer than 9 characters are keyed in then the data cannot be accurate.

5. Existence check. A bar code is read at a supermarket checkout till. The code is sent to the main computer which will search for that code on the stock file. As the stock file contains details of all items held in stock, if it is not there then the item cannot exist, which it obviously does, therefore the code must have been wrongly read.

6. Check digit. When the code is read on the item at the supermarket, it consists of numbers. One number is special; it is called the check digit. If the other numbers have some arithmetic done to them using a simple algorithm the answer should be this special digit. When the code is read at the checkout till, if the arithmetic does not give the check digit it must have been read wrongly, it is at this point that the beeping sound would normally be heard if everything is alright.

