

Computational Thinking

Week 1 Practice Assignment

Computational Thinking

Week 1 Practice Assignment

Question 1 to 3

Statement

Question 1 [2 Marks]

Statement

Answer

Question 2 [2 Marks]

Statement

Answer

Question 3 [2 Marks]

Statement

Answer

Solution

Question 4 [4 Marks]

Answer: d

Solution

Question 5 [4 Marks]

Answer: c

Solution

Question 6 to 7

Question 6 [2 Marks]

Answer: 42

Question 7 [2 Marks]

Answer: 45

Solution

Question 8 [4 Marks]

Answer: c

Solution

Question 9 [4 Marks]

Answer: b and d

Solution

Question 10 [5 Marks]

Answer: b

Solution

Question 11 [5 Marks]

Answer: d

Solution

Question 12 [4 Marks]

Answer: 2

Solution

Question 1 to 3

Statement

What will be the values of **A**, **B** and **C** after execution of the following procedure using the "Scores" dataset?

Step 1: Arrange all cards in a single pile called Pile 1

Step 2: Maintain three variables **A**, **B**, **C** and initialize them to 0

Step 3: If Pile 1 is empty then stop the iteration

Step 4: Read the top card in Pile 1

Step 5: If *Date of Birth* < "1 May" then increment **A**

Step 6: If *Date of Birth* > "30 April" and *Date of Birth* < "1 September" then increment **B**

Step 7: If *Date of Birth* > "31 August" then increment **C**

Step 8: Move the current card to another pile called Pile 2 and repeat from step 3

Question 1 [2 Marks]

Statement

The value of **A** is ____?

Answer

10

Question 2 [2 Marks]

Statement

The value of **B** is ____?

Answer

9

Question 3 [2 Marks]

Statement

The value of **C** is ____?

Answer

11

Solution

In this question we have to find exact values of three variables **A**, **B** and **C**. So, let us start with the procedure. Here in step 2 we have declared three variables **A**, **B**, **C** and also initialized them to 0.

In step 5, variable **A** is getting incremented if date of birth is less than 1st May which means we are counting the number of students born on or before 30th April. In this step variable **B** is getting incremented if date of birth is greater than 30th April and less than 1st September. Which

indicated that variable **B** is counting the number of students born between 1st may and 31st August inclusive. In step 7 we are checking for date of birth greater than 31st August which means variable **C** is counting the number of students born after 31st August as in starting from 1st September onwards. It is a repeat step which indicates that this procedure is getting executed on all the cards available in the dataset. Therefore, if we compile all the date of births from the dataset then we will get following categorization:

Cards counted under variable	Card numbers
A	2, 5, 6, 7, 8, 10, 11, 12, 21, 27
B	1, 3, 13, 14, 19, 22, 23, 25, 26
C	0, 4, 9, 15, 16, 17, 18, 20, 24, 28, 29

Question 4 [4 Marks]

The following procedure is executed using the "Shopping Bills" dataset. What will **X** represent at the end of execution?

Step 1: Arrange all cards in a single pile called Pile 1

Step 2: Initialize variables **A**, **B** and **X** to 0

Step 3: If Pile 1 is empty then stop the iteration and execute step 7

Step 4: Read the top card in Pile 1

Step 5: If the *Shop name* is not "SV Stores" then add *Total bill amount* to **A** and increment **B**

Step 6: Move the current card to another pile called Pile 2 and repeat from step 3

Step 7: Divide **A** by **B** and store the result in **X**

(a) Total bill amount from "SV Stores"

(b) Number of bills from "SV Stores"

(c) Average of total bill amount from "SV Stores"

(d) Average of total bill amount from all shops other than "BSV Stores"

Answer: d

Solution

In Step 1 cards are arranged in to a single pile and which is called as Pile 1. In Step 2 we are creating 3 new variables called **A**, **B**, and **X** and assigning the value 0 to them. Step 3 checks whether the iteration has to be continued or not. If the pile 1 is empty then the iteration has to be stopped. In Step 4, the top card of the Pile 1 is taken and read. *Total bill amount* is added to **A**, and **B** is incremented for all other *Shop name* other than "SV Stores". That is **A** is storing the sum of *Total bill amount* from all other shops other than SV Stores, **B** is counting the number of shops apart from "SV Stores". Finally, in Step 6, the current card is moved to another pile called Pile 2 and the procedure is repeated from Step 3. This step will be executed only if Pile 1 has become empty. The result of \mathbf{A} / \mathbf{B} is stored in **X**. Hence, **X** represents the average of total bill amount from all shops other than "SV Stores".

Question 5 [4 Marks]

The following pseudocode is executed using the "Words" dataset. What will **A** represent at the end of execution?

Step 1: Arrange all cards in a single pile called Pile 1

Step 2: Initialize variable **A** to 0

Step 3: If Pile 1 is empty then stop the iteration

Step 4: Read the top card in Pile 1

Step 5: If the *Word* does not end with a full stop and *Part of Speech* is "Noun" then increment **A**

Step 6: Move the current card to another pile called Pile 2 and repeat from step 3

- (a) Total number of nouns
- (b) Total number of words
- (c) Number of nouns which are not at the end of a sentence
- (d) Number of nouns which are at the end of a sentence

Answer: c

Solution

In Step 1 cards are arranged in to a single pile and which is called as Pile 1. In Step 2 we are creating a new variables called **A** and assigning the value 0 to it. Step 3 checks whether the iteration has to be continued or not. If the pile 1 is empty then the iteration has to be stopped. In Step 4, the top card of the Pile 1 is taken and read. **A** is incremented for all nouns except which appear at the end of a sentence. So it is clear that **A** is counting all "Nouns" except which are at the end of a sentence. Finally, in Step 6, the current card is moved to another pile called Pile 2 and the procedure is repeated from Step 3.

Question 6 to 7

The following pseudocode is executed using the "Scores" dataset.

Step 1: Arrange all cards in a single pile called Pile 1

Step 2: Initialize variables **A** and **B** to 1000

Step 3: If Pile 1 is empty then stop the iteration

Step 4: Read the top card in Pile 1

Step 5: If *Mathematics marks* < **A** then store *Mathematics marks* in **A**

Step 6: If *Physics marks* < **B** then store *Physics marks* in **B**

Step 7: Move the current card to another pile called Pile 2 and repeat from step 3

Question 6 [2 Marks]

The value of **A** is ____?

Answer: 42

Question 7 [2 Marks]

The value of **B** is ____?

Answer: 45

Solution

In Step 1 cards are arranged in to a single pile and which is called as Pile 1. In Step 2 we are creating two new variables called **A**, **B** and assigning the value 1000 to it. Step 3 checks whether the iteration has to be continued or not. If the pile 1 is empty then the iteration has to be stopped. In Step 4, the top card of the Pile 1 is taken and read. **A** is updated only if the card's *Mathematics marks* are less than the existing value of **A**. **A** is initialized with 1000 and will be updated with the less *Mathematics marks* at the end of iteration. Hence, **A** stores the minimum *Mathematics marks*. **B** is updated only if the card's *Physics marks* are less than the existing value of **B**. **B** is initialized to 1000 and will be updated with the less *Physics marks* at the end of iteration. Hence, **B** stores the minimum *Physics marks*. Finally, in Step 7, the current card is moved to another pile called Pile 2 and the procedure is repeated from Step 3.

Question 8 [4 Marks]

The following pseudocode is executed using the "Words" dataset. What will **count** represent at the end of execution?

Step 1: Arrange all cards in a single pile called Pile 1

Step 2: Initialize variables **A** and **count** to 0

Step 3: If Pile 1 is empty then stop the iteration

Step 4: Read the top card in Pile 1

Step 5: If the *Word* is "Monday" and **A** = 0 then increment **A**

Step 6: If the *Word* ends with a full stop and **A** > 0 then increment **count**

Step 7: If the *Word* ends with a full stop then reinitialize **A** to 0

Step 8: Move the current card to another pile called Pile 2 and repeat from step 3

- (a) Number of times the word "Monday" has occurred
- (b) Number of sentences that have the word "Monday" only once in it
- (c) Number of sentences that have at least one occurrence of the word "Monday"
- (d) Number of sentences that have at most one occurrence of the word "Monday"

Answer: c

Solution

In Step 1 cards are arranged in to a single pile and which is called as Pile 1. In Step 2 we are creating two new variables called **A**, **count** and assigning the value 0 to it. Step 3 checks whether the iteration has to be continued or not. If the pile 1 is empty then the iteration has to be stopped. In Step 4, the top card of the Pile 1 is taken and read. **A** is incremented only if the Word is "Monday" and **A** is equal to 0. At the end of each sentence **count** is incremented only if **A** is greater than zero. **A** is reinitialized to zero. So at the beginning of every sentence **A** will be zero always. Finally, in Step 8, the current card is moved to another called Pile 2 and the procedure is repeated from Step 3. Hence, count represents the number of sentences that have at least one occurrence of the word "Monday".

Question 9 [4 Marks]

The given information represents a "Shopping Bill" and it may have some mistakes with respect to the sanity of data. Identify all rows with such mistakes. It is a Multiple Select Question (MSQ).

Row no.	Item	Category	Qty	Price	Cost
Row 1	Onions	Vegetables/Food	4	98	392
Row 2	Maggi	Vegetables/Food	2	85	85
Row 3	Face Wash	Toiletries	1	100	100
Row 4	Dustpan	Household	1.5	60	90
Row 5	Milk	Dairy/Food	2	50	100

- (a) Row 1
- (b) Row 2
- (c) Row 3
- (d) Row 4
- (e) Row 5

Answer: b and d

Solution

There is a mistake either in Qty or in Price or in Cost. So there is sanity of data in Line 4. Dustpan given Qty as 1.5 but must be an integer

Question 10 [5 Marks]

Select the most appropriate datatype specific to "Words" dataset for the left column.

Field	Datatype
a. Sequence number of Card	i. Integer
b. The word "Yellow"	ii. Boolean
c. Letter Count	iii. String
d. Part of Speech	iv. Character
e. Is first letter of the word a vowel?	

- (a) a - (i), b - (iii), c - (ii), d - (iii), e - (ii)
- (b) a - (i), b - (iii), c - (i), d - (iii), e - (ii)
- (c) a - (i), b - (iii), c - (ii), d - (iii), e - (i)
- (d) a - (i), b - (ii), c - (i), d - (iv), e - (ii)
- (e) a - (iii), b - (i), c - (ii), d - (ii), e - (iv)
- (f) a - (iii), b - (iii), c - (i), d - (i), e - (i)

Answer: b

Solution

Sequence number of Card is a number. Hence, it is an integer.

The word "Yellow" is a sequence of character in double quotes, it is a string.

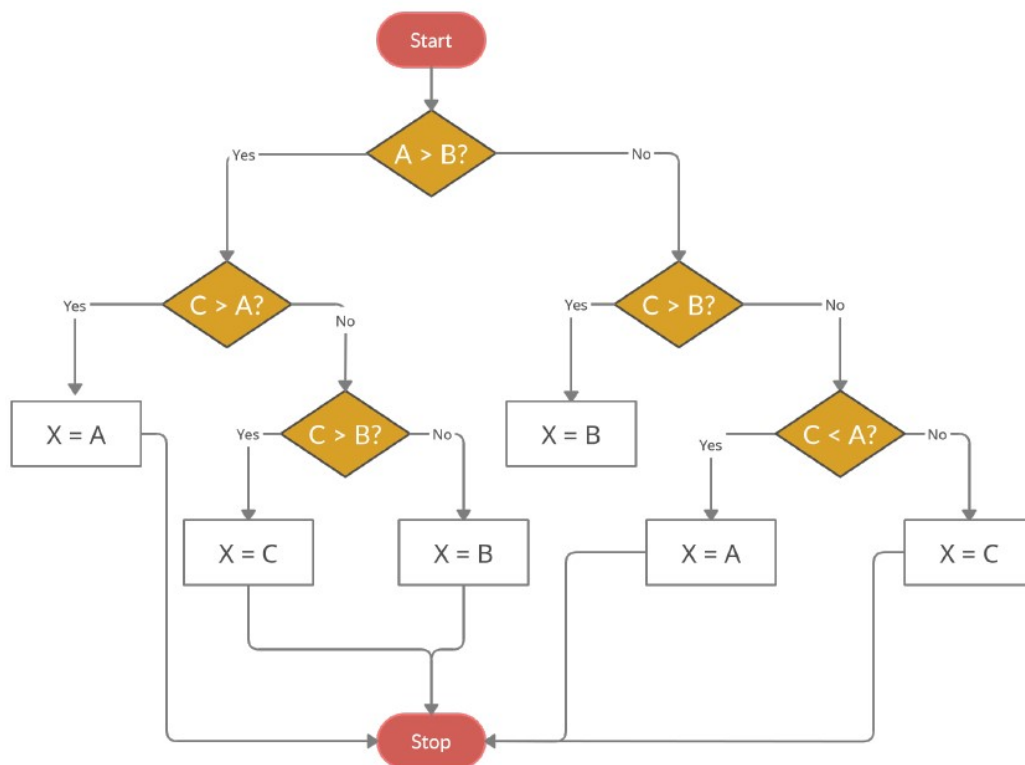
Letter Count is a number. Hence, it is an integer.

Part of Speech is a sequence of character in double quotes, it is a string.

Is first letter of the word a vowel? will give a Boolean value since we are checking whether first letter of word is vowel or not.

Question 11 [5 Marks]

Interpret the following flowchart and answer the following question. Let **A**, **B** and **C** be three distinct integers of given as input. What will **X** represent at the end of flowchart?



- (a) Largest number among **A**, **B** and **C**
- (b) Smallest number among **A**, **B** and **C**
- (c) Mean of **A**, **B** and **C**
- (b) Second largest number among **A**, **B** and **C**

Answer: d

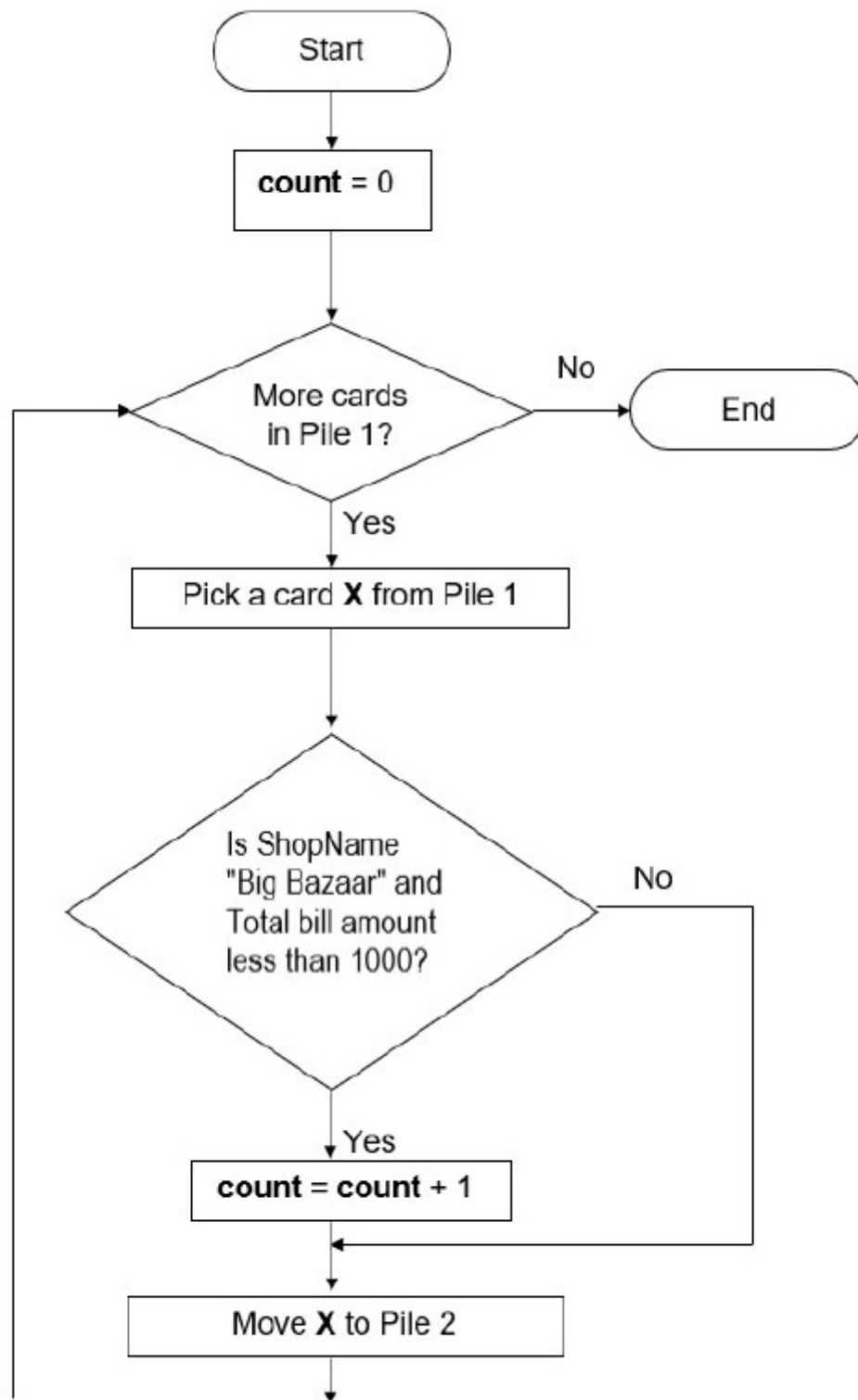
Solution

Three distinct integers **A**, **B** and **C** are given as input. Integers **A** and **B** are compared first. If **A** is greater than **B** then flow of code moves to next conditional block where **A** is again compared with **C**. If **C** is greater than **A** then **A** is stored in **X**. If **C** is not greater than **A** then **C** is compared with **B**. If **C** is greater than **B** then **C** is stored in **X** otherwise **B** is stored in **X**. When **A** is not greater than **B** then flow of code moves to next conditional block where **B** is compared to **C**. If **C** is greater than **B**

then B is stored in X. If **C** is less than A then A is stored in X otherwise **C** is stored in **X**. So we can conclude that **X** stores second largest number among **A**, **B** and **C**.

Question 12 [4 Marks]

The following flow chart is executed using the "Shopping Bills" dataset. Interpret the flowchart and answer the given question.



The value of **count** is ____?

Answer: 2

Solution

The variable **count** is initialized to zero. In the first decision box we are checking whether there are more cards in Pile 1 or not. If the condition is not satisfied the flowchart is terminated. If the condition is satisfied card **X** is picked from Pile 1. And in the second decision box the condition whether the *ShopName* is "Big Bazaar" and if *Total bill amount* is less than 1000 is checked. If this condition is satisfied then **count** is incremented and the card is moved to another Pile called pile 2. If this condition is not satisfied **count** is not incremented but the card is moved to another Pile called pile 2. From here the flow goes to the first decision box that is checking whether there are more cards in Pile 1 and the whole process continues till the Pile 1 becomes empty. The variable **count** represents the number of cards from "Big Bazaar" with total bill amount less than 1000.