Timed Mock for Quiz - 1

Question-1 [2 Marks]

Statement

The following pseudocode is executed using the “Scores” dataset. What will **A** represent at the end of execution?

```
A = 0
while(Table 1 has more rows){
    Read the first row X in Table 1
    if(X.Gender == “M” and X.CityTown == “Chennai”){
        A = A + X.Mathematics
    }
    Move X to Table 2
}
```

Options

(a)

Sum of Mathematics marks of students from Chennai

(b)

Sum of Mathematics marks of male students from Chennai

(c)

Sum of Mathematics marks of male students

(d)

Sum of Mathematics marks of male students not from Chennai

Answer

(b)

Solution

In the question we need to find what **A** will represent at the end of the execution. Here initially **A** is assigned to 0, and **A** is only updated when the condition, `if (X.Gender == “M” and X.CityTown == “Chennai”)`, is satisfied. We have two conditions inside the if ( ) which is separated by ‘and’, therefore both of the conditions need to be satisfied to update A. Here the update statement is `A = A + X.Mathematics` where the mathematics marks of current card X is added to **A**.

Question-2 [2 Marks]

Statement

Match the following expressions in the Column 1 with the appropriate values in column 2.

Column 1	Column 2
a. 2 = 2 or 2 > 3	1. Invalid expression
b. 2 == 2 and 2 > 3	2. True
c. 2 = 3	3. False
d. 2 + '2'	4. 4
e. 2 >=2	5. "22"

Options

(a)

a - (2), b - (3), c - (1), d - (1), e - (2)

(b)

a - (1), b - (3), c - (1), d - (1), e - (2)

(c)

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

(d)

a - (1), b - (3), c - (2), d - (1), e - (1)

Answer

(b)

Solution

Column 1	Explanation
a. 2 = 2 or 2 > 3	2 = 2 is an Invalid expression because assignment is for variables not the values(like integer,strings,etc). 2 > 3 is a False statement. Therefore, Invalid **(a. maps to 1.)**
b. 2 == 2 and 2 > 3	2 == 2 is a True statement. 2 > 3 is a False statement. Therefore, True and False = False. **(b. maps to 3.)**
c. 2 = 3	2 = 3 is an Invalid expression. **(c. maps to 1.)**
d. 2 + '2'	2 + ‘2’ is an Invalid expression. Addition of two different data types is not possible.
e. 2 >=2	2 >= 2 means 2 is greater than or equal to 2. 2 is greater than 2 is a False statement but 2 is equal to 2 is a True statement. These two statements are connected with "or" which leads to True statement.

Question-3 [3 Marks]

Statement

The following pseudocode is executed using the “Library” dataset. At the end of the execution, **A** captures the maximum number of pages of a book which is written in a language other than English. Choose the correct code fragment to complete the pseudocode.

```
A = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    **********************
    *   Fill the code    *
    **********************
    Move X to Table 2
}
```

Options

(a)

```
if(X.Language == “English” and X.Pages > A){
    A = X.Pages
}
```

(b)

```
if(X.Language != “English” and X.Pages > A){
    A = X.Pages
}
```

(c)

```
if(X.Language != “English” and X.Pages < A){
    A = X.Pages
}
```

(d)

```
if(X.Language == “English” and X.Pages < A){
    A = X.Pages
}
```

Answer

(b)

Solution

At the end of the execution, **A** captures the maximum number of pages of a book which is written in a language other than English. Here initially **A** is assigned to 0. Also we have one more condition to be satisfied which is language of the book shouldn't be of English. Therefore the code block which complete the pseudocode is

```
if(X.Language != "English" and X.Pages > A){
    A = X.Pages
}
```

Question-4 [2 Marks]

Statement

The following pseudocode is executed using the “Scores” dataset. At the end of the execution, **A** captures the second highest marks in Mathematics. Assume that **Max** holds the value of the highest mark in Mathematics. Choose the correct code fragment to complete the pseudocode.

```
A = 0
while(Table 1 has more rows){
    Read the first row X in Table 1
    **********************
    * Fill the code *
    **********************
    Move the row X to Table 2
}
```

Options

(a)

```
if(X.Mathematics > A){
    A = X.Mathematics
}
```

(b)

```
if(X.Mathematics > Max and X.Mathematics < A){
    A = X.Mathematics
}
```

(c)

```
if(X.Mathematics < Max and X.Mathematics > A){
    A = X.Mathematics
}
```

(d)

```
if(X.Mathematics < Max){
    A = X.Mathematics
}
```

Answer

(c)

Solution

In the question we need to store the second highest mark in **A**, where highest mark is already stored in the variable **Max**. Initially **A** is initialized to 0. To store the maximum number of pages, **A** needs to be updated as `A = X.Pages` whenever `X.Pages > A`. But here we need to store the second highest mark in **A** and hence we need to ensure `X.Mathematics` is lesser than the **Max**. Therefore the code block which complete the pseudocode is

```
if(X.Mathematics < Max and X.Mathematics > A){
    A = X.Mathematics
}
```

Question 5 [3 Marks]

Statement

Let **X** be a row in the “Words” table. Let **isShortVerb** be a procedure to find whether the word in the row **X** is a verb with letter count at most five. Choose the correct code fragment to complete the pseudocode.

```
Procedure isShortVerb(X)
    **********************
    *   Fill the code    *
    **********************
End isShortVerb
```

Options

(a)

```
if(X.PartOfSpeech == “Verb”){
    return(True)
}
else{
    return(False)
}
```

(b)

```
if(X.PartOfSpeech == “Verb” and X.LetterCount ≤ 5){
    return(False)
}
else{
    return(True)
}
```

(c)

```
if(X.PartOfSpeech == “Verb” or X.LetterCount ≤ 5){
    return(True)
}
else{
    return(False)
}
```

(d)

```
if(X.PartOfSpeech == “Verb” and X.LetterCount ≤ 5){
    return(True)
}
else{
    return(False)
}
```

Answer

(d)

Solution

isShortVerb is a procedure which finds whether the word in the row **X** is a verb with letter count at most five. We need the procedure to return ‘True’ when both the conditions, “word is a verb” and “letter count atmost 5”, are satisfied. Therefore, the code block which complete the pseudocode is

```
if(X.PartOfSpeech == “Verb” and X.LetterCount ≤ 5){
    return(True)
}
else{
    return(False)
}
```

Question-6 [4 Marks]

Statement

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

```
A = 0
while(Table 1 has more rows){
    Read the first row X in Table 1
    i = 1, B = True
    while(i ≤ X.LetterCount){
        if(ith letter of X.Word is a vowel){
            B = False
        }
        i = i + 1
    }
    if(B){
        A = A + 1
    }
    Move X to Table 2
}
```

Options

(a)

Number of words with at most one vowel

(b)

Number of words with at exactly one vowel

(c)

Number of words without vowels

(d)

Number of words with vowel count at most 2

Answer

(c)

Solution

We need to find what **A** will represent at the end of the execution. Here initially **A** is assigned to 0 and **A** is only updated when **B** is ’True’. Initially we have a `while (Table 1 has more rows)` loop which iterates along each and every word in the paragraph. Inside the loop we initialize **B** to ’True’. Following we have nested loop, `while (i ≤ X.LetterCount)`, inside the above mentioned while loop. Here we are iterating through every letter of the **X**.*Word*. Inside the nested loop, `while (i ≤ X.LetterCount)`, we are checking the condition `if (i th letter of X.Word is a`

`vowel)`. When the condition satisfied at least once **B** is updated as 'False'. Since the **A** is updated inside the `while (Table 1 has more rows)` and outside the `while (i ≤ X.LetterCount)` loop, **A** is updated when **X**.*Word* contains no vowels in it.

Question-7 [3 Marks]

Statement

The following pseudocode is executed using the “Library” dataset. At the end of the execution, **A** captures the number of books which are published after 2010 or have less than the average number of pages. Assume that the variable **Avg** holds the value of the average number of pages of the books in the dataset. The pseudocode may have mistakes. Identify all such mistakes (if any). It is a Multiple Select Question (MSQ).

```
1  A = 0
2  while(Table 1 has more rows){
3      Read the first row X in Table 1
4      C = False
5      if(X.Year > 2010){
6          C = True
7      }
8      if(X.Pages > Avg){
9          C = True
10     }
11     if(C){
12         A = 1
13     }
14     Move X to Table 2
15 }
```

Options

(a)

Error in Line 5

(b)

Error in Line 8

(c)

Error in Line 9

(d)

Error in Line 12

(e)

No error

Answer

(b), (d)

Solution

A captures the number of books which are published after 2010 or have less than the average number of pages. We need to find the mistakes in the pseudocode. Since **A** captures the number of books, **A** needs to be incremented once the conditions satisfied. **But in Line 12 A is always assigned to 1**. This is one of mistake in the pseudocode. The correct statement would be

```
A = A + 1
```

Here for each book **C** is initialized to 'False' and we have two if blocks, in the code, which is used to update, **C** to 'True', once the conditions inside the if blocks are satisfied. Here in the second if block, Line 8, `if (X.Pages > Avg),` it checks whether the pages are greater than average pages. This is another mistake. We need to check whether the pages are lesser than the average pages. So correct statement would be `if (X.Pages < Avg)`

Question-8 [3 Marks]

Statement

The following pseudocode is executed using the “Library” dataset. At the end of the execution, **A** is set to True if and only if there is a pair of books with same genre and same year of publication. Choose the correct code fragment to complete the pseudocode.

```
A = False
while(Table 1 has more rows){
    Read the first row X in Table 1
    Move X to Table 2
    while(Table 1 has more rows){
        Read the first row Y in Table 1
        Move Y to Table 3
        **********************
        *   Fill the code    *
        **********************
    }
    Move all rows from Table 3 to Table 1
}
```

Options

(a)

```
if(X.Genre == Y.Genre or X.Year == Y.Year){
    A = True
}
```

(b)

```
if(X.Genre == Y.Genre and X.Year == Y.Year){
    A = True
}
```

(c)

```
if(X.Genre == Y.Genre or X.Year == Y.Year){
    A = False
}
```

(d)

```
if(X.Genre == Y.Genre and X.Year == Y.Year){
    A = False
}
```

Answer

(b)

Solution

We need to set **A** to 'True' if there is a pair of books with same genre and same year of publication. Initially **A** is assigned as 'False'. As we need to compare each book with all other books we have nested loop in this pseudocode. Once we find a pair which satisfies the conditions we need to update **A** to 'True'. Here there are two conditions to be satisfied, "Books should be same genre" and "Books should be of same publication". Therefore the code block which complete the pseudocode is

```
if(X.Genre == Y.Genre and X.Year == Y.Year){
    A = True
}
```

Question-9 [3 Marks]

Statement

The following pseudocode is executed using the “Library” dataset. What will **A** and **B** represent at the end of the execution?

```
A = 0, B = 0
while(Table 1 has more rows){
    Read the first row X in Table 1
    if(X.Pages == A){
        B = B + 1
    }
    if(X.Pages > A){
        A = X.Pages
        B = 1
    }
    Move X to Table 2
}
```

Options

(a)

A = Number of books with maximum number of pages

B = Maximum number of pages across all books

(b)

A = Maximum number of pages across all books

B = Number of books with maximum number of pages

(c)

A = Minimum number of pages across all books

B = It is always one

(d)

A = Maximum number of pages across all books

B = It is always one

Answer

(b)

Solution

In the question we need to find what **A** and **B** will represent at the end of the execution. Here initially **A** and **B** is assigned to 0. Two code-blocks are used to update the values in **A** and **B**.

Code-block 1

```
if(X.Pages == A){
    B = B + 1
}
```

Code-block 2

```
if(X.Pages > A){
    A = X.Pages
    B = 1
}
```

Code-block 2 is used to find the maximum number of pages across all the books. Whenever, **A** is updated, the value of **B** is assigned as 1.

Code-block 1 is used to update **B** . Here B is incremented whenever it finds books with same number of pages as **A**.

Question-10 [4 Marks]

Statement

The following pseudocode is executed using the “Words” dataset. What will **C** represent at the end of the execution?

```
C = 0
while(Table 1 has more rows){
    Read the first row X from Table 1
    Move X to Table 2
    if(X.Word ends with a full stop){
        C = C + GetSomething(Table 2)
        Clear all rows in Table 2
    }
}

Procedure GetSomething(Table 2)
    A = 0
    While(Table 2 has more rows){
        Read the first row X in Table 2
        Move X to Table 3
        while(Table 2 has more rows){
            Read the first row Y in Table 2
            if(X.LetterCount ≠ Y.LetterCount and X.PartOfSpeech == Y.PartOfSpeech){
                A = A + 1
            }
            Move Y to Table 4
        }
        Move all rows from Table 4 to Table 2
    }
    return (A)
End GetSomething
```

Options

(a)

Number of pairs of words with the same part of speech and letter count

(b)

Number of pairs of words with the same part of speech and different letter count

(c)

Number of pairs of words with the same part of speech and letter count, that occur in the same sentence

(d)

Number of pairs of words with same part of speech and different letter count, that occur in the same sentence

Answer

(d)

Solution

In the pseudocode an iteration, while (....), is used to go through each and every words in the paragraph. The words in Table 1 is moved to Table 2 till the condition, `if (X.Word ends with a full stop)`, is satisfied. Here Table 2 contains the words of a single sentence. **C** is updated using the return value of the Procedure **GetSomething** inside the if condition. The procedure Procedure **GetSomething** takes the parameter as Table 2 which is essentially words of a sentence. Using nested while conditions each and every pair of words in a sentence is compared. For comparison the given condition is used.

```
1 if(X.LetterCount != Y.LetterCount and X.PartOfSpeech == Y.PartOfSpeech)
```

Here **A** is incremented if the pair of words in a sentence satisfies the condition. So essentially **C** is the number of pairs of words with same part of speech and different letter count, that occur in the same sentence

Question-11 [5 Marks]

Statement

Let **A** be an author who had written a book in the “Library” dataset and **B** be a positive integer value. What does the procedure **DoSomething** compute?

```
Procedure DoSomething(A, B)
    C = 1900, D = 2022
    while(Table 1 has more rows){
        Read the first row X in Table 1
        if(X.Author == A){
            if(X.Year > C){
                C = X.Year
            }
            if(X.Year < D){
                D = X.Year
            }
        }
        Move X to Table 2
    }
    if(C – D ≥ B){
        return(True)
    }
    else{
        return(False)
    }
End DoSomething
```

Options

(a)

Outputs “True” if and only if the second book of the author **A** was published at least **B** years after their first book was published

(b)

Outputs “True” if and only if the last book of the author **A** was published at least **B** years after their first book was published

(c)

Outputs “True” if and only if the last book of the author **A** was published at least **B** years after their second-last book was published

(d)

Outputs “True” if and only if the last book of the author **A** was published at least **B** years before their first book was published

Answer

(b)

Solution

Here the procedure **DoSomething** accepts the parameters **A**, author, and **B**, a positive integer. An iteration, while (....), is used to go through each and every rows in the table. Inside the loop nested if conditions are used. The outer if, `if (X.Author == A),` condition checks whether the author of the book matches with the parameter **A**. There are two if conditions inside the outer if, `if (X.Year > C)` and `if (X.Year < D).` Here the first condition save the year of last book published in variable **C** and the second condition saves the year of first book published in **D**.

After the while loop, the last block of if, `if (C–D ≥ B),` checks whether the difference between the year of last book and first book is at least **B**.

Question-12 [5 Marks]

Statement

The following pseudocode is executed using the “Scores” dataset. At the end of the execution, **A** captures the number of female students who are above average in at least one subject. Assume that **M**, **P** and **C** hold the average marks of the subjects Mathematics, Physics and Chemistry respectively. The pseudocode may have mistakes. Identify all such mistakes (if any). It is a Multiple Select Question (MSQ).

```
1  A = 0
2  while(Table 1 has more cards){
3      Read the first row X from Table 1
4      if(CheckSomething(X, M, P, C)){
5          A = 1
6      }
7      Move X to Table 2
8  }
9  Procedure CheckSomething(Y, C1, C2, C3)
10     if(Y.Gender == “F”){
11         if(Y.Mathematics > C1 and Y.Physics > C2 and Y.Chemistry > C3){
12             return (True)
13         }
14         else{
15             return(False)
16         }
17     }
18     else{
19         return(False)
20     }
21 End CheckSomething
```

Options

(a)

Error in Line 4

(b)

Error in Line 5

(c)

Error in Line 10

(d)

Error in Line 11

(e)

Multiple return(False) in procedure **CheckSomething**

(f)

No error

Answer

(b), (d)

Solution

Here the **A** which captures the number of female students who are above average in at least one subject. An iteration, while (....), is used to go through each and every rows in the Scores table. For each card the **A** is assigned to value 1 when the condition, `if (CheckSomething(X, M, P, C)),` is satisfied.

Since **A** holds the number of students which satisfies the conditions specified in the question, **A** needs to be incremented. This is one of the mistake in the code. The purpose of the Procedure **CheckSomething** is to return true when the conditions in the questions are satisfied. The first condition, `if (Y.Gender == “F”),` checks whether the student is Female. The nested condition, `if (Y.Mathematics > C1 and Y.Physics > C2 and Y.Chemistry > C3),` checks whether the marks of all the subjects are greater than the average marks of each subject. This is another mistake in the code. We need to check at least whether marks of one of the subject is greater than the average mark. So the correct condition is

```
1 if (Y.Mathematics > C1 or Y.Physics > C2 or Y.Chemistry > C3)
```

Question 13

Statement

The following pseudocode is executed using the “Words” dataset. At the end of the execution, **A** captures the number of sentences with at least two nouns that have at most 2 vowels. The pseudocode may have mistakes. Identify all such mistakes (if any). It is a Multiple Select Question (MSQ).

```
1  A = 0, C = 0
2  while(Table 1 has more cards){
3      Read the first row X from Table 1
4      if(X.PartOfSpeech == “Noun” and CountVowels(X) ≤ 2){
5          C = C + 1
6      }
7      if(X.Word ends with a full stop){
8          if(C ≥ 2){
9              A = A + 1
10             C = 0
11         }
12     }
13     Move X to Table 2
14 }
15 Procedure CountVowels(Y)
16     i = 1
17     B = 0
18     while(i ≤ Y.LetterCount){
19         if(ith letter of Y.Word is a vowel){
20             B = B + 1
21             i = i + 1
22         }
23     }
24     return(B)
25 End CountVowel
```

Options

(a)

Line 5: Error in updating **C**

(b)

Line 9: **A** is updated in wrong place

(c)

Line 10: **C** is updated in wrong place

(d)

Line 20: **B** is updated in wrong place

(e)

Line 21: **i** is updated in wrong place

(f)

Line 24: Return value is incorrect

Answer

(c), (e)

Solution

Here the **A** which captures the number of sentences with at least two nouns that have at most 2 vowels. An iteration, while (....), is used to go through each and every words in the paragraph. There are two if conditions inside the while loop. The first if, if `(X.PartOfSpeech == “Noun” and CountVowels(X) ≤ 2)`, checks whether the part of speech is Noun and return value of the procedure, **CountVowels**, is at most 2.

The next if, `if (i th letter of Y.Word is a vowel)`, is executed at the end of a sentence. At the end of the sentence **A** is incremented if the condition, `if (C ≥ 2)` is satisfied. Also **C** is initialized to 0 inside the if (C ≥ 2) condition. This is a mistake in the pseudocode. **C** should be initialized to 0 after the end of the sentence irrespective of the condition, `if (C ≥ 2)`. Therefore C is updated in wrong place. Instead **C** needs to be updated between the line 11 and line 12.

The procedure **CountVowels**, returns the number of vowels in a word. Here **i** is used to iterate along the letters of words. But here **i** is only incremented when the condition, `if (i th letter of Y.Word is a vowel),` is satisfied. This is another mistake in the pseudocode. Here, **i** should be incremented irrespective of the condition, `if (i th letter of Y.Word is a vowel).` The correct place to increment **i** is between line 22 and line 23.

Question-14 [6 Marks]

Statement

The following pseudocode is executed using the “Scores” dataset. At the end of the execution, **C** captures the number of pairs of students who have the same date of birth, or the same City/Town but different gender. Choose the correct code fragment(s) to complete the pseudocode. It is a Multiple Select Question (MSQ).

```
C = 0
while(Table 1 has more rows){
    Read the first row X in Table 1
    Move X to Table 2
    while(Table 1 has more rows){
        Read the first row Y in Table 1
        Move Y to Table 3
        **********************
        *   Fill the code    *
        **********************
    }
    Move all rows from Table 3 to Table 1
}
```

Options

(a)

```
if(X.DateOfBirth == Y.DateOfBirth){
    C = C + 1
}
if(X.Gender != Y.Gender and X.CityTown == Y.CityTown){
    C = C + 1
}
```

(b)

```
if(X.DateOfBirth == Y.DateOfBirth){
    C = C + 1
}
else{
    if(X.Gender != Y.Gender and X.CityTown == Y.CityTown){
        C = C + 1
    }
}
```

(c)

```
if(X.DateOfBirth == Y.DateOfBirth){
    if(X.Gender != Y.Gender and X.CityTown == Y.CityTown){
        C = C + 1
    }
}
```

(d)

```
if((X.DateOfBirth == Y.DateOfBirth) or (X.Gender != Y.Gender and X.CityTown
== Y.CityTown)){
    C = C + 1
}
```

Answer

(b), (d)

Solution

Here **C** captures the number of pairs of students who have the same date of birth, or the same City/Town but different gender. Here the conditions needs to be satisfied are “Same date of birth” OR “Different gender and Same City/Town”. There are two code blocks in the options which can be used to complete the code, They are

```
if(X.DateOfBirth == Y.DateOfBirth){
    C = C + 1
}
else{
    if (X.Gender!= Y.Gender and X.CityTown == Y.CityTown){
        C = C + 1
    }
}
```

and

```
if((X.DateOfBirth == Y.DateOfBirth) or (X.Gender != Y.Gender and X.CityTown
== Y.CityTown)){
    C = C + 1
}
```