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Instructions

1. ***Read through each question and then write the required solution.***
2. ***Pseudocode(s) and Flowchart(s) must be answered on this question paper below the question and the \*.pdf file uploaded to Moodle.***
3. ***For python code, the \* . py file must be uploaded to Moodle***

**QUESTION ONE**



STOP

START

**Required**

1. Write the pseudocode corresponding to the above flowchart. **[8 marks]**
2. Write the python code corresponding to the above flowchart. Use functions in your python solution. Document the python code. **[6 marks]**

**START**

**DECLARE** count, daysOut as **INTEGER**

**DECLARE** fine as **REAL**

**DECLARE** title, ISBNo as **STRING**

**COUNT** = 0

**PRINT** “Enter number of books being returned:”

**READ** numBooks

**WHILE** count < numBooks DO

PRINT “Enter book title, ISBN#, days outstanding:”

READ title, ISBNo, daysOut

**IF**(daysOut > 0) **THEN**

FINE = daysOut\*20

**ELSE**

fine = 0

**ENDIF**

**PRINT** title, ISBNo, fine

Count = count + 1

**ENDWHILE**

**STOP**

|  |  |  |
| --- | --- | --- |
| **INPUT** | **PROCESSING** | **OUTPUT** |
| Enter number of books being returned | numBooks, daysOut | **fine** |
| Enter book title, ISBN#, days outstanding: |  |  |
|  |  |  |

**QUESTION TWO**

A leading credit union wishes to award the children of its members who have performed excellently in the recent GSAT examinations. The system will first prompt for the member’s ID, then also accept the name of the child and the average GSAT score. Use an appropriate sentinel value for the member’s ID to signal that no more records are to be processed. The average GSAT score should be used to determine the type of award that the child will receive as represented in the table below:

|  |  |
| --- | --- |
| SCORE | AWARD |
| Over 90 and up to 100 (inclusive) | (S) Scholarship |
| Over 85 and up to 90 (inclusive) | (G) Grant |
| 80 and up to 85 (inclusive) | (B) Bursary |

No award is granted if the average GSAT score entered for a record is less than 80. For each record, display the member’s ID, child’s name and the award granted; display ‘No award’ where necessary. The system should also display the following information:

* total number of records entered
* total number of *each* type of award granted.

1. Write an algorithm for a solution to the above question **[6 marks]**
2. Enter memberID
3. Enter name
4. Enter avgScore
5. If score is 80% or above, award.

* Display total number of records entered

1. Display total number of *each* type of award granted.
2. Create an IPO chart for the problem described. **[5 marks]**

|  |  |  |
| --- | --- | --- |
| **INPUT** | **PROCESSING** | **OUTPUT** |
| memberID | records |  |
| name | records |  |
| avgScore | Score   * If scores are at or below award ranges | No Award  Award   * total number of records entered. * total number of *each* type of award granted. |
|  |  |  |
|  |  |  |

1. Design the **flowchart** for the problem described above. **[12 marks]**

**QUESTION THREE**

**FUNCTION calculate\_taxes()**

DECLARE no\_children as INTEGER

DECLARE taxable\_income, tax, netaxable\_income, net\_tax, rate as REAL

DECLARE tax\_list(15) as REAL *{creating a list to store the calculatedtax}*

PRINT “Please enter the number of children:”

INPUT no\_children

PRINT “Please enter taxable income:”

INPUT taxable\_income

WHILE count < 15 DO

IF no\_children == 0

IF taxable\_income <= 8000 THEN

rate = 0.1

ELSE

IF taxable\_income >8000 AND taxable\_income <=30000 THEN

rate = 0.15

ELSE

IF taxable\_income >30000 AND taxable\_income <= 70000 THEN

rate = 0.25

ELSE

rate = 0.30

ENDIF

ENDIF

ENDIF

ELSE

IF taxable\_income <= 8000 THEN

rate = 0.1 – 0 .025

ELSE

IF taxable\_income > 8000 AND taxable\_income <= 30000 THEN

rate = 0.15 - 0.025

ELSE

IF taxable\_income > 30000 AND taxable\_income <= 70000 THEN

rate = 0.25 - 0.025

ELSE

rate = 0.30 – 0.025

ENDIF

ENDIF

ENDIF

ENDIF

tax = taxable\_income \*rate

net\_income = taxable\_income – tax

PRINT “You pay ”, tax, “ income tax”

PRINT “Your Net pay is: ”, net\_income

tax\_list(count) = tax {adding the calculated tax to the list}

sum = sum + tax

count = count + 1

ENDWHILE

**{function continues on the next page}**

**{summing and printing the contents of the list}**

FOR count = 1 TO 15 DO

sum = sum + tax\_list(count)

PRINT tax\_list(count)

ENDFOR

PRINT “The average bill is: “, (sum/5)

**RETURN**

**START**

CALL Function calculateTaxes()

**STOP**

**Required:**

Write the python code for the pseudocode given above. Implement the two functions as indicated. Program must be properly documented.

**[18 marks]**

**\*\*\*\* End of Lab Test 1\*\*\*\***