

UNIVERSITI TEKNOLOGI MARA

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| **COURSE** | **:** | **INTRODUCTION TO ALGORITHM DESIGN AND DEVELOPMENT** |
| **COURSE CODE** | **:** | **CSC121** |
| **ASSESSMENT** | **:** | **PRACTICAL TEST** |
| **NAME** | **:** |  |
| **MATRIC NO** | **:** |  |
| **GROUP** | **:** |  |

### This assessment is designed to attain the followings:

* **Course Learning Outcome:** CLO2

*Display practical skills in algorithm design and developments for different types of programming control structures.*

* **Program Learning Outcome:** PLO3

*Thinking and scientific skills.*

**Instructions:**

1. This is an individual assignment.
2. Time given for this assignment is 2 hours.
3. You must solve programming the problem using algorithm representation using flowchart.
4. Flowchart should be drawn using the correct symbols.
5. For any intention of plagiarism or any misconduct of this assignment, the student will be penalized according to the rules, and a zero mark will be awarded due to the action.

**SCENARIO:**

MediaTech College is developing a C++ program to calculate the total fee for each student enrolling in the upcoming semester. The fee structure consists of registration fee, tuition fee and utilities fee. As an initiative to provide financial assistance to their students, the college offers a few discounts based on academic performance and family income.

Table 1 lists the fees students must pay:

**Table 1 Student’s Fee Structure**

|  |  |  |
| --- | --- | --- |
| **Fee Type** | **Year of Study** | **Fee (RM)** |
| Registration | 1st and 2nd year | 499.00 |
|  | 3rd year | 199.00 |
| Tuition | 1st year | 520.00 |
|  | 2nd year | 650.00 |
|  | 3rd year | 900.00 |
| Utilities | All students | 220.00 |

The college offers a 70% discount on utilities fee for all 2nd and 3rd year students with CPGA of 3.50 and above. Additionally, students with a family income less than RM 1500.00 will receive a 25% discount on tuition fee. The discounts are shown in Table 2:

**Table 2 Student’s Fee Discount**

|  |  |  |
| --- | --- | --- |
| **Discount Description** | **Impacted Fee** | **Rate (%)** |
| All students with a CGPA of 3.5 and above (**except for 1st year students**) | Utilities Fee | 70 |
| All students with family income less than RM1500.00 | Tuition Fee | 25 |

Your program should prompt the user to input the following information:

* Students full name
* Student's year of study (1st, 2nd or 3rd year)
* Student's CGPA (only required for 2nd and 3rd year students)
* Student's family income (applicable for all students)

Your program should display the following information to user:

* Students full name
* Amount of registration fee, tuition fee before discount and utility fee before discount
* Discount amount for tuition fee and utility fee
* Total amount to be paid

Note: The algorithm should clearly represent the logic of the program. However, the program should still provide clear instructions to the user. Also, ensure to test your algorithm with different input values to verify its correctness.

**TASK:**

Based on the description above, please complete the following task.

1. Write a complete IPO for the Scenarios given above.
2. Draw the corresponding flowchart based on the IPO in question 1.
3. State the type of selection control structure used in your answer in (1) and (2).
4. Given the input below, calculate the total discounted amount and total fee to be paid for each in situation (i) and (ii)
5. Year of study : 2

CGPA : 3.71

Family Income (RM) : 1499.00

1. Year of study : 1

Family Income (RM) : 1499.00

70

**SCORING RUBRIC**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attributes** | **No Submission** | **Poor** | **Fair** | **Good** | **Excellent** | **Weight** | **Marks** |
|  | **0** | **1** | **2** | **3** | **4** |  |  |
| **Pseudocode Readibility** | No Submission | Poor use of white space (indentation, blank lines).     Disorganized and messy.     Poor use of variables and control structures. | White space makes program fairly easy to read.    Partially organized work.    Fairly use of variables and control structures. | Good use of white space.    Sufficiently organized work.    Good use of variables and control structures. | Excellent use of white space.    Creatively organized work.    Excellent use of variables control structures. | 3 |  |
| **Flowchart Readibility** | No Submission | The flowchart is poorly organized and very difficult to read.    The flowchart shapes are wrongly presented | The flowchart is readable only by someone who knows what it is supposed to be doing.    The flowchart shapes are partial wrongly presented | The flowchart is fairly easy to read.    The flowchart shapes are sufficient presented | The flowchart is exceptionally well organized and very easy to follow.    The flowchart shapes are well presented | 3 |  |
| **Algorithm Efficiency** | No Submission | A difficult and inefficient solution.   Does not included required control structures.   The algorithm was lengthy | A logical solution, easy to follow but not the most efficient.   Partially or does not include required control structures.    The algorithm was lengthy. | Solution is efficient and easy to follow (i.e., no confusing tricks).    Included required control structures.    Fits a reasonable length of algorithm. | Solution is efficient, easy to understand and maintain.     Included required control structures.     Fits a reasonable length of algorithm. | 4 |  |
| **Algorithm Logic** | No Submission | Does not present any due to errors.   User prompts are misleading or non-existent.   No testing has been completed. | Executes with some errors.     User prompts contain little information, poor design.    Some testing has been completed. | Executes without errors.     User prompts are understandable, minimum use of symbols or spacing in output.    Some testing has been completed and present appropriate solution. | Executes without errors.     Excellent user prompts, good use of symbols or spacing in output (neatly displayed).    Testing has been completed and present appropriate solution. | 4 |  |
| **Problem Solving** | No Submission | Does not present any problem solving | Fairly solve the required problem. | Good solve the required problem. | Excellent solve the required problem. | 3.5 |  |
|  |  |  |  |  |  | Total |  |