**Assignment No. 03**

**Section 02**

**Topic: Cause and Effect Graph**

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# **Description**

To get the CGPA there must input some values for example semester, gpa, credit hours. According to input the program can perform or print some actions for example:

* If Semester (which should be less than equal to 16), credit hours (which should be less than equal to 21) then program can calculate sum of credit hours.
* If Semester (which should be less than equal to 16), gpa (which should be less than equal to 14) then program can calculate sum of gpa.
* If semester greater than 16 then message printed “Please re-Enter Semester It should be less than 16”.
* If credit hours greater than 21 then message printed “Please re-Enter Credit Hours, it should be less than 21”.
* If gpa is greater than 4 then message printed “Please re-Enter GPA It should be less than 4”.
* If semester less than equal to 16, credit hours less than equal to 21 and gpa less than equal to 4 than CGPA can calculated successfully.

# **Identify all causes and effects**

The causes for this situation are:

* C1 – Semester entered
* C2 – Credit hours entered
* C3 – GPA entered

The effects(results) for this situation are:

* E1 – Sum of credit hours
* E2 – Sum of GPA
* E3 – Print message “Invalid **semester** entered it should be less than equal to 16”
* E4 – Print message “Invalid **credit hours** entered it should be less than equal to 21”
* E5 – Print message “Invalid **gpa** entered it should be less than equal to 4”
* E6 – CGPA calculation Successful

# **Cause effect graph**

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So as per the above diagram, for E1 to be true the condition is (C1 ^ C2)

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So as per the above diagram, for E2 to be true the condition is (C1 ^ C3)

So as per the above diagram, for E3 to be false the condition is !(C1) i.e. not of C1

So as per the above diagram, for E4 to be false the condition is !(C2) i.e. not of C2

So as per the above diagram, for E4 to be false the condition is !(C3) i.e. not of C3

^

So as per the above diagram, for E6 to be true the condition is (C1 ^ C2 ^ C3)

**So as per the above diagram**

For **E1** to be true the condition is **(C1 ^ C2)**

For **E2** to be true the condition is **(C1 ^ C3)**

For **E3** to be false the condition is !**(C1)**

For **E4** to be false the condition is !**(C2)**

For **E5** to be false the condition is !**(C3)**

For **E6** to be true the condition is **(C1 ^ C2 ^ C3)**

# **Decision table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Actions** | **T1** | **T2** | **T3** | **T4** | **T5** | **ST6** |
| **C1** | **1** | **1** | **0** | 0 | 0 | **1** |
| **C2** | **1** | 0 | 0 | **0** | 0 | **1** |
| **C3** | 0 | **1** | 0 | 0 | **0** | **1** |
| **E1** | **1** | 0 | 0 | 0 | 0 | 0 |
| **E2** | 0 | **1** | 0 | 0 | 0 | 0 |
| **E3** | 0 | 0 | **1** | 0 | 0 | 0 |
| **E4** | 0 | 0 | 0 | **1** | 0 | 0 |
| **E5** | 0 | 0 | 0 | 0 | **1** | 0 |
| **E6** | 0 | 0 | 0 | 0 | 0 | **1** |

# **Test cases**

|  |  |  |
| --- | --- | --- |
| **Test No.** | **Input** | **Output** |
|  | Semester= 2 and credit hours= 16 | Sum of Credit |
|  | Semester= 4 and gpa=3.3 | Sum of gpa |
|  | Semester=20 | Invalid Semester |
|  | Credit hours=29 | Invalid Credit hours |
|  | Gpa=5 | Invalid gpa |
|  | Semester=2, credit hour=19, gpa=4 | CGPA Calculated Successful |

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