**Assignment no. 2**

FA21-BCS-053 (MUHAMMAD SAAD SULEMAN)

comsats UNIVERSITY, LAHORE CAMPUS.

Problem Statement**:**

**Write down a program to calculate the CGPA of a student after certain number of**

**semesters. The program first inputs the number of semester, which the student has completed so far.**

**The number of semesters may range from 1 to 8. If the student enters an invalid semester, loop again**

**until he enters correct semester number (HINT: use a sentinel controlled while loop to do this).**

**Then, it should ask the user to input marks in the subjects taken in each semester. The student may have**

**taken variable number of subjects in each semester, which may vary from 1 to 7. The user may either**

**enter the marks of all the 7 subjects taken in a semester, or input -1 in place of marks in order to exit**

**before entering the marks of all the 7 subjects. The marks should be in [0-100] range. If the student**

**enters an invalid marks for a subject, then assign 50 marks to that subject. The program should also**

**display the grade of each subject, as soon as the student enters the marks of that subject.**

# Answer:

# **CODE:**

|  |
| --- |
| #include <stdio.h>  #include <stdlib.h>  #include <conio.h>  int main**()**  **{**  /\*Variable Declarations\*/  int semester**,**counter**=**1**,**subjects**,**counter\_2**,**marks**,**CHD**;**  float CP**=**0.0**;** // CP means Credit Points  float collective\_CP**=**0.0**;**  float total\_CP**=**0.0**;**  float sem\_gpa**=**0.0**;** // sem\_gpa means semester gpa  char grade**,**signs**;**  int count\_prob**=**0**;** // variable for counting no of probabtions  float c\_gpa**=**0.0**;**  /\* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\*/  again**:** // label of goto statement  printf**(**"Enter Total semesters: "**);**  scanf**(**"%d"**,&**semester**);**  /\* if statement in case user inputs semester greater than 8\*/  **if(**semester**>**8 **||** semester**<**1**)**  **{**  printf**(**"\nYou have entered an invalid amount of semester, Please Enter Again\n"**);**  printf**(**"\nHit Enter Key to input the total semesters again\n"**);**  getch**();**  system**(**"cls"**);**  printf**(**"\n"**);**  **goto** again**;**  **}**  /\*outer loop for asking how many subjects student has studied in a semester\*/  **while(**counter**<=**semester**)**  **{**  label**:**  printf**(**"\n\nEnter the no. of subjects you took in semester %d: "**,**counter**);**  scanf**(**"%d"**,&**subjects**);**  **if(**subjects**>=**8 **||** subjects**<=**0**)**  **{**  printf**(**"\n\nMaximum Subject that you can take in one semester is 7, please enter the no. of subjects again.\n"**);**  printf**(**"\n\nPress enter to Input subjects again: "**);**  getch**();**  **goto** label**;**  **}**  /\* inner loop used for entering marks for subject in a semester \*/  **for(**counter\_2**=**1**;**counter\_2**<=**subjects **&&** marks**!=-**1**;**counter\_2**++)**  **{**  printf**(**"\n\_\_\_\_\_\_\_\_\_READ\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\n\nEnter Marks in subject %d "**,**counter\_2**);**  printf**(**"\nOr enter -1 in place of marks if you do not wish to enter marks for more subjects in semester %d"**,**counter\_2**);**  printf**(**"\n\n\_\_\_\_\_\_\_ENTER MARKS\_\_\_\_\_\_\_\n\n"**);**  printf**(**"\n\tMarks: "**);**  scanf**(**"%d"**,&**marks**);**  /\* bunch of if statements for grading and assigning credit points for obtained marks\*/  **if(**marks**>=**101**)**  **{**  marks**=**50**;**  **}**  **if(**marks**<-**1**)**  **{**  marks**=**50**;**  **}**  **if(**marks**>=**85**)**  **{**  grade**=**'A'**;**  **switch(**marks**)**  **{**  **case** 85**:**  CP**=**3.67**;**  **break;**  **case** 86**:**  CP**=**3.69**;**  **break;**  **case** 87**:**  CP**=**3.71**;**  **break;**  **case** 88**:**  CP**=**3.73**;**  **break;**  **case** 89**:**  CP**=**3.75**;**  **break;**  **case** 90**:**  CP**=**3.77**;**  **break;**  **case** 91**:**  CP**=**3.79**;**  **break;**  **case** 92**:**  CP**=**3.81**;**  **break;**  **case** 93**:**  CP**=**3.84**;**  **break;**  **case** 94**:**  CP**=**3.87**;**  **break;**  **case** 95**:**  CP**=**3.90**;**  **break;**  **case** 96**:**  CP**=**3.92**;**  **case** 97**:**  CP**=**3.94**;**  **break;**  **case** 98**:**  CP**=**3.98**;**  **case** 99**:**  CP**=**4.0**;**  **break;**  **case** 100**:**  CP**=**4.0**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**CP**);**  collective\_CP**+=(**CP**);**//body of if  **}**  **if(**marks**>=**80 **&&** marks**<=**84 **)**  **{**  grade**=**'A'**;**  signs**=**'-'**;**  **switch(**marks**)**  **{**  **case** 80**:**  CP**=**3.34**;**  **break;**  **case** 81**:**  CP**=**3.40**;**  **break;**  **case** 82**:**  CP**=**3.50**;**  **break;**  **case** 83**:**  CP**=**3.58**;**  **break;**  **case** 84**:**  CP**=**3.66**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c%c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**signs**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**75 **&&** marks**<=**79 **)**  **{**  grade**=**'B'**;**  signs**=**'+'**;**  **switch(**marks**)**  **{**  **case** 75**:**  CP**=**3.01**;**  **break;**  **case** 76**:**  CP**=**3.10**;**  **break;**  **case** 77**:**  CP**=**3.20**;**  **break;**  **case** 78**:**  CP**=**3.30**;**  **break;**  **case** 79**:**  CP**=**3.33**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c%c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**signs**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**71 **&&** marks**<=**74 **)**  **{**  grade**=**'B'**;**  **switch(**marks**)**  **{**  **case** 71**:**  CP**=**2.67**;**  **break;**  **case** 72**:**  CP**=**2.70**;**  **break;**  **case** 73**:**  CP**=**2.90**;**  **break;**  **case** 74**:**  CP**=**3.00**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**68 **&&** marks**<=**70 **)**  **{**  grade**=**'B'**;**  signs**=**'-'**;**  **switch(**marks**)**  **{**  **case** 68**:**  CP**=**2.34**;**  **break;**  **case** 69**:**  CP**=**2.40**;**  **break;**  **case** 70**:**  CP**=**2.66**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c%c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**signs**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**64 **&&** marks**<=**67 **)**  **{**  grade**=**'C'**;**  signs**=**'+'**;**  **switch(**marks**)**  **{**  **case** 64**:**  CP**=**2.01**;**  **break;**  **case** 65**:**  CP**=**2.28**;**  **break;**  **case** 66**:**  CP**=**2.30**;**  **break;**  **case** 67**:**  CP**=**2.33**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c%c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**signs**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**61 **&&** marks**<=**63 **)**  **{**  grade**=**'C'**;**  **switch(**marks**)**  **{**  **case** 61**:**  CP**=**1.67**;**  **break;**  **case** 62**:**  CP**=**1.80**;**  **break;**  **case** 63**:**  CP**=**2.00**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**58 **&&** marks**<=**60 **)**  **{**  grade**=**'C'**;**  signs**=**'-'**;**  **switch(**marks**)**  **{**  **case** 58**:**  CP**=**1.31**;**  **break;**  **case** 59**:**  CP**=**1.41**;**  **break;**  **case** 60**:**  CP**=**1.66**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c%c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**signs**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**54 **&&** marks**<=**57 **)**  **{**  grade**=**'D'**;**  signs**=**'+'**;**  **switch(**marks**)**  **{**  **case** 54**:**  CP**=**1.01**;**  **break;**  **case** 55**:**  CP**=**1.09**;**  **break;**  **case** 56**:**  CP**=**1.18**;**  **break;**  **case** 57**:**  CP**=**1.30**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c%c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**signs**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(**marks**>=**50 **&&** marks**<=**53 **)**  **{**  grade**=**'D'**;**  **switch(**marks**)**  **{**  **case** 50**:**  CP**=**0.10**;**  **break;**  **case** 51**:**  CP**=**0.50**;**  **break;**  **case** 52**:**  CP**=**0.70**;**  **break;**  **case** 53**:**  CP**=**1.00**;**  **break;**  **}**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  **if(** marks**<**50 **)**  **{**  grade**=**'F'**;**  CP**=**0.0**;**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SUBJECT RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\nSubject: %d\tMarks: %d\tGrade: %c\tCredit Points: %f"**,**counter\_2**,**marks**,**grade**,**CP**);**  collective\_CP**+=(**CP**);**  **}**  /\*\_\_\_\_\_\_\_\_\_\_\_\_\_\_END OF IF STATEMENTS USED FOR ASSIGNING GRADES AND CREDIT POINTS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\*/  **}** // END OF INNER LOOP  CHD**=**4**\***subjects**;** // TOTAL CREDIT HOURS OF ONE SEMESTER  printf**(**"\n"**);**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_SEMESTER %d RESULT\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**,**counter**);**  printf**(**"\n\tTotal Credit Hours: %d"**,**CHD**);**  printf**(**"\n\tTotal Credit Points: %f"**,**collective\_CP**\***4**);**  sem\_gpa**=(**collective\_CP**\***4.0**)/**CHD**;** // FORMULA FOR CALCULATING GPA IN A SEMESTER  printf**(**"\n\tGPA of semester %d: %f"**,**counter**,**sem\_gpa**);**  c\_gpa**=(**c\_gpa**+**sem\_gpa**)/**counter**;** // FOR COMMUTATIVE GPA  /\*Rules for failing semester i.e gpa<2.0\*/  **if(**sem\_gpa**<**2.0**)**  **{**  printf**(**"\n\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n\n"**);**  printf**(**"\n\nProbabation Warning! Please improve your grades.\n\n"**);**  **}**  **if(**counter**<=**4**)**  **{**  **if(**counter**==**1 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**++;**  **}**  **if(**counter**==**2 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**+=**2**;**  **}**  **if(**counter**==**3 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**+=**4**;**  **}**  **if(**counter**==**4 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**+=**4**;**  **}**  // alot of ifs idk meh :/  **if(**count\_prob**==**3 **||** count\_prob**==**6 **||** count\_prob**==**8 **||** count\_prob**==**9 **||** count\_prob**==**10 **)**  **{**  printf**(**"\nYou are dismissed!\n"**);**  **goto** label2**;**  **}**  **}**  **if(**counter**==**5 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**++;**  **}**  **if(**counter**==**6 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**+=**2**;**  **}**  **if(**counter**==**7 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**+=**4**;**  **}**  **if(**counter**==**8 **&&** sem\_gpa**<**2.0**)**  **{**  count\_prob**+=**4**;**  **}**  // alot of ifs idk meh :/  **if(**count\_prob**==**3 **||** count\_prob**==**6 **||** count\_prob**==**8 **||** count\_prob**==**9 **||** count\_prob**==**10 **)**  **{**  printf**(**"\nYou will have to \"Repeat Semester\"\n"**);**  **goto** label2**;**  **}**  collective\_CP**=**0.0**;**  counter**++;**  **}** // end of outer loop  printf**(**"\n"**);**  printf**(**"\n\_\_\_\_\_\_\_\_\_\_\_\_\_\_ FINAL RESULT \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n"**);**  printf**(**"\n\n\t Your CGPA is %.3f\n\n"**,**c\_gpa**);**  label2**:**  **return** 0**;**  **}** |

# **OUTPUT:**

A screenshot of a computer

Description automatically generated with medium confidence

A screenshot of a computer

Description automatically generated with medium confidence