NORTHERN UNIVERSITY BANGLADESH

CGPA Calculator

This program calculates the Cumulative Grade Point Average (CGPA) for a variable number of subjects based on the marks obtained. It then displays the CGPA for each subject along with the total CGPA and overall result (Pass/Fail).

Developers Information

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How It Works

1. User inputs the number of subjects and their respective marks (out of 100).
2. For each subject, the program calculates the CGPA using predefined criteria.
3. The CGPA for each subject is displayed along with the result (Pass/Fail).
4. The total CGPA is calculated as the average of CGPAs for all subjects.
5. The overall result (Pass/Fail) is determined based on the total CGPA.

Code Explanation

The provided C code has been updated to dynamically handle a variable number of subjects:

Function: calculateSubjectCGPA()

This function calculates the CGPA for a given subject based on the marks obtained.

```
#include <stdio.h>
```

```
// Calculate CGPA for a subject
float calculateSubjectCGPA(int marks) {
    if (marks >= 90 && marks <= 100) {
        return 4.0;  // Highest grade
    } else if (marks >= 80 && marks < 90) {
        return 3.7;
    } else if (marks >= 70 && marks < 80) {
        return 3.3;
    } else if (marks >= 60 && marks < 70) {
        return 3.0;
    } else if (marks >= 50 && marks < 60) {
        return 2.7;
    } else if (marks >= 40 && marks < 50) {
        return 2.3;
    } else {
        return 0.0; // Returning 0.0 for failing marks
    }
}
```

Function: printSubjectResult()

This function prints the CGPA for a subject along with the subject name and whether the student has passed or failed.

```
// Print subject result
void printSubjectResult(const char* subjectName, float cgpa) {
    printf("CGPA for %s: %.2f", subjectName, cgpa);
    if (cgpa < 2.0) {
        printf(" - Fail"); // If CGPA is less than 2.0, student fails
    }
    printf("\n");
}
```

Main Function: main()

The main function orchestrates the entire process, taking input for the number of subjects and their marks, calculating CGPA for each subject, and then determining the overall result based on the total CGPA.

```
int main() {
    int numSubjects;
    printf("Enter the number of subjects: ");
    scanf("%d", &numSubjects);

    if (numSubjects <= 0) {
        printf("Invalid number of subjects. Please enter a positive number.\n");
        return 1;
    }

    int marks[MAX_SUBJECTS];
    float total_cgpa = 0.0;
    int anySubjectFailed = 0; // Flag to check if any subject is failed

    // Input marks for each subject
    for (int i = 0; i < numSubjects; i++) {
        printf("Enter marks for subject %d (out of 100): ", i + 1);
        scanf("%d", &marks[i]);
```

```
        float cgpa = calculateSubjectCGPA(marks[i]);
        char subjectName[20];
        sprintf(subjectName, "Subject %d", i + 1);
        printSubjectResult(subjectName, cgpa);

        total_cgpa += cgpa;

        // Check if subject is failed
        if (cgpa < 2.0) {
            anySubjectFailed = 1; // Set the flag to indicate failure
        }
    }

    // Calculate average CGPA
    if (numSubjects > 0) {
        total_cgpa /= numSubjects;
    }

    // Display total CGPA
    printf("\nTotal CGPA: %.2f", total_cgpa);
    if (anySubjectFailed) {
        printf(" - Fail"); // If any subject is failed, display overall result a
    }
    printf("\n");

    return 0;
}
```

Result

The output of the program will be displayed here, showing the CGPA for each subject and the overall CGPA along with the result (Pass/Fail).