

DAA LAB-1

CALCULATE SPI & CPI

Algorithm

- step 1:- Start
- step 2:- Create a function to calculate the SPI
- step 3:- In the function ask user to input enter number of subjects and take that as input
- step 4:- Run a for loop that will run for n times where n is no.s of subjects entered by user. In this for loop take input of grades and credits if (grade is negative) show output error! and grade cannot be negative
- step 5:- Now for calculation
define total_scr and total_cred
define $SPI = 1.0 \times \text{total_scr} / \text{total_credit}$
- step 6:- Exit function
- step 7:- create a function to calculate CPI
- step 8:- Ask user to enter number of semester and take that as input 'n'
- step 9:- run a for loop that will run for n times where n is no.s of semester entered by user and in this loop take input of semester SPI if SPI is entered is negative then show error that spi cannot be negative
- step 10:- Now for calculation
define total_spi += spi_values[i]
define $CPI = 1.0 * \text{total_spi} / n$
- step 11:- Exit function
- step 12:- Enter int main()
- step 13:- call SPI and CPI function
- step 14:- END

CODE

```
void spi_calc()
```

```
Input number of subjects as n
```

```
for (int i=1; i<=n; i++) {
```

```
    cout << "Enter credit and grade" << i << endl;
```

```
    cin >> credit[i] >> grade[i];
```

```
    if (grade[i] < 0)
```

```
        cout << "Error, grade cannot be negative";
```

```
}
```

```
// calculation of SPI
```

```
int tot_scr = 0;
```

```
int tot_cred = 0;
```

```
for (int i=1; i<=n; i++) {
```

```
    tot_scr += grade[i] * credit[i];
```

```
    tot_cred += credit[i];
```

```
}
```

```
float spi = 1.0 * tot_scr / tot_cred;
```

```
cout << spi << endl;
```



```
void cpi_calc () {
```

```
    cout << "No. of semester "<< endl;
```

```
    cin >> n;
```

```
    for (int i=1; i <= n; i++) {
```

```
        cout << "Enter SPI for semester "<< endl;
```

```
        cin >> SPI[i];
```

```
        if (SPI[i] < 0) {
```

```
            cout << "Error! SPI cannot be negative" << endl;
```

```
        }
```

```
    }
```

```
    float total_SPI = 0;
```

```
    for (int i=1; i <= n; i++) {
```

```
        total_SPI += SPI[i];
```

```
    }
```

```
    float cpi = total_SPI / n;
```

```
    cout << "Your cpi is " << endl;
```

```
}
```

```
int main () {
```

```
    void spi_calc(); // call the fn
```

```
    cpi_calc(); // call the fn
```

```
    return 0;
```

```
}
```


① Test case 1:-

subjects:- 12

credit = [1, 2, 1, 2, 3, 2, 2, 2, 2, 3, 1, 2]

grade = [10, 9, 9, 9, 10, 7, 9, 10, 9, 7, 8, 8]

expected SPI = 8.64

number of semester = 2

SPI = [8.64, 8.64]

expected CPI = 8.64

② Test case 2:-

subjects = 5

credit = [2, ...,]

grade = [-3, ...,]

expected output \Rightarrow error!!

semesters = 2

SPI = [10, 10]

expected CPI = error

③ Test case 3:-

subjects:- 7
 credit:- [2, 1, 1, 3, 3, 2, 3]
 grade:- [10, 9, 9, 8, 7, 10, 9]
 expected SPI = 8.67
 Enter semester = 3
 SPI = [8.67, 9.41, 9.07]
 expected CPI = 9.05

④ Test case 4:-

subjects:- 6
 credits:- [2, 2, 3, 3, 1, 3]
 grade:- [9, 9, 7, 10, 10, 7]
 expected SPI = 8.48

semesters:- 4
 SPI = [10, 8.43, 8.77, 9.82]
 expected CPI = 9.26

⑤ Test case 5:-

subjects:- 4
 credit:- [4, 3, 2, 2]
 grade:- [10, 9, 8, 10]
 expected SPI = 9.36

semester:- 4
 SPI = [9.37, 9.51, 8.79, 7.0]
 expected CPI = 8.69

Conclusion:-

In this laboratory assignment we have learnt or implemented the algorithm for calculating SPI and CPI of semesters in college. We have used C++ for this implementation. Our code has generated perfect expected output for all given test cases both positive and negative.

[CPI, SPI, SPI, SPI] = 192
20.8 = 192

-14 9200 1200

[CPI, SPI, SPI, SPI] = 192
[CPI, SPI, SPI, SPI] = 192
84.8 = 192

[CPI, SPI, SPI, SPI] = 192
20.8 = 192

-12 9200 1200

[CPI, SPI, SPI, SPI] = 192
20.8 = 192

[CPI, SPI, SPI, SPI] = 192
[CPI, SPI, SPI, SPI] = 192
20.8 = 192