

STRUCTURED PROGRAMMING APPROACH

ASSIGNMENT NO 4

MINI PROJECT

Topic: Calculation of CGPA (Pointers) using C Language

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PROBLEM DEFINITION :

Program to calculate CGPA pointer of respective subjects: Applied Mathematics I, Basic Electrical Engineering, Engineering Mechanics, Applied Physics I, Applied Chemistry I, Environmental Studies and Basic Workshop Practice and the total CGPA Pointer.

ALGORITHM:

ALGORITHM FOR MAIN FUNCTION

Step 1 : Start

Step 2 : Declare arrays p[7],c[7]

Step 3 :Declare variables p_marks , tw_marks , t_credits ,p_credits ,t_pointer

p_pointer, t, t1, t2, t3, t4, t_p ,t_percentage,p_percentage,i,j=0

Step 4 : Repeat steps 5 to 12 for i=0 to i<7

Step 5 : if i=0

Step 5.1 : Initialize tw_marks=25,t_marks=100 ,t_credit=4 ,p_credit=1

Step 5.2 : Display "MATHEMATICS"

Step 5.3 : Display "Enter your marks out of 80"

Step 5.4 : Read t1

Step 5.5 : Display "Enter your internal assessment marks (out of 20)"

Step 5.6 :Read t2

Step 5.7 :t=t1+t2

Step 5.8 : Calling function by value : t_percentage=percent(t,t_marks)

Step 5.9 : Calling function by value : t_pointer =grade(t_percentage)

Step 5.10 : Display "Enter your term work marks"

Step 5.11 :Read t3

Step 5.12 :Calling function by value p_percentage=percent(t3,tw_marks)

Step 5.13 : Calling function by value t_pointer=grade(p_percentage)

Step 5.14 : If t_pointer =0 or p_pointer =0 ,then p[i]=0

Else p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit*p_credit)

goto step 12

Step 6 : if i=1

Step 6.1 : Initialize tw_marks=25,t_marks=100,p_marks=25 ,t_credit=4 ,p_credit=1,c[i]=5

Step 6.2 : Display "BASIC ELECTRICAL ENGINEERING"

Step 6.3 :Display "Enter your marks out of 80"

Step 6.4 :Read t1

Step 6.5 : Display "Enter your internal assessment marks (out of 20)"

Step 6.6 :Read t2

Step 6.7 :t=t1+t2

Step 6.8 : Calling function by value : t_percentage=percent(t,t_marks)

Step 6.9 : Calling function by value : t_pointer =grade(t_percentage)

Step 6.10 : Display "Enter your term work marks (out of 25)"

Step 6.11 :Read t3

Step 6.12: Display "Enter your practical /viva marks (out of 25)"

Step 6.13 : Read t4

Step 6.14 : t_p=t3+t4

Step 6.15 :Calling function by value p_percentage=percent(t_p,(tw_marks+p_marks))

Step 6.16 : Calling function by value p_pointer=grade(p_percentage)

Step 6.17 : If t_pointer =0 or p_pointer =0 ,then p[i]=0

Else p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit*p_credit)

goto step 12

Step 7 : if i=2

Step 7.1 : Initialize tw_marks=25,t_marks=100 ,p_marks=25,t_credit=5 ,p_credit=1,c[i]=6

Step 7.2 : Display "ENGINEERING MECHANICS"

Step 7.3 :Display "Enter your marks out of 80"

Step 7.4 :Read t1

Step 7.5 : Display "Enter your internal assessment marks (out of 20)"

Step 7.6 :Read t2

Step 7.7:t=t1+t2

Step 7.8 : Calling function by value : t_percentage=percent(t,t_marks)

Step 7.9 : Calling function by value : t_pointer =grade(t_percentage)

Step 7.10: Display "Enter your term work marks (out of 25)"

Step 7.11 :Read t3

Step 7.12 : Display "Enter your practical /viva marks (out of 25)"

Step 7.13 : Read t4

Step 7.14 : $t_p = t_3 + t_4$

Step 7.15: Calling function by value $p_percentage = \text{percent}(t_p, (tw_marks + p_marks))$

Step 7.16 : Calling function by value $p_pointer = \text{grade}(p_percentage)$

Step 7.17: If $t_pointer = 0$ or $p_pointer = 0$,then $p[i] = 0$

Else $p[i] = (t_pointer * t_credit + p_pointer * p_credit) / (t_credit * p_credit)$

goto step 12

Step 8: if $i = 3$

Step 8.1: Initialize $tw_marks = 25, t_marks = 75, t_credit = 3, p_credit = 0.5, c[i] = 3.5$

Step 8.2: Display "APPLIED PHYSICS I"

Step 8.3: Display "Enter your marks out of 60"

Step 8.4: Read t_1

Step 8.5: Display "Enter your internal assessment marks (out of 15)"

Step 8.6: Read t_2

Step 8.7: $t = t_1 + t_2$

Step 8.8: Calling function by value : $t_percentage = \text{percent}(t, t_marks)$

Step 8.9: Calling function by value : $t_pointer = \text{grade}(t_percentage)$

Step 8.10: Display "Enter your term work marks (out of 25)"

Step 8.11: Read t_3

Step 8.12: Calling function by value $p_percentage = \text{percent}(t_3, tw_marks)$

Step 8.13: Calling function by value $p_pointer = \text{grade}(p_percentage)$

Step 8.14: If $t_pointer = 0$ or $p_pointer = 0$,then $p[i] = 0$

Else $p[i] = (t_pointer * t_credit + p_pointer * p_credit) / (t_credit * p_credit)$

goto step 12

Step 9: if $i = 4$

Step 9.1 :Initialize $tw_marks = 25, t_marks = 75, t_credit = 3, p_credit = 0.5, c[i] = 3.5$

Step 9.2: Display "APPLIED CHEMISTRY I"

Step 9.3: Display "Enter your marks out of 60"

Step 9.4: Read t_1

Step 9.5: Display "Enter your internal assessment marks (out of 15)"

Step 9.6: Read t2

Step 9.7: $t = t_1 + t_2$

Step 9.8: Calling function by value : $t_percentage = percent(t, t_marks)$

Step 9.9: Calling function by value : $t_pointer = grade(t_percentage)$

Step 9.10: Display "Enter your term work marks (out of 25)"

Step 9.11: Read t3

Step 9.12: Calling function by value $p_percentage = percent(t_3, tw_marks)$

Step 9.13: Calling function by value $p_pointer = grade(p_percentage)$

Step 9.14: If $t_pointer = 0$ or $p_pointer = 0$, then $p[i] = 0$

Else $p[i] = (t_pointer * t_credit + p_pointer * p_credit) / (t_credit * p_credit)$

goto step 12

Step 10 : if $i = 5$

Step 10.1 : Initialize $t_marks = 75$, $t_credit = 2$, $c[i] = 2$

Step 10.2 : Display "ENVIRONMENTAL STUDIES "

Step 10.3 : Display "Enter your marks out of 60"

Step 10.4 : Read t1

Step 10.5 : Display "Enter your internal assessment marks (out of 15)"

Step 10.6 : Read t2

Step 10.7 : $t = t_1 + t_2$

Step 10.8 : Calling function by value : $t_percentage = percent(t, t_marks)$

Step 10.9 : Calling function by value : $t_pointer = grade(t_percentage)$

Step 10.10 : $P[i] = t_pointer$ goto 12

Step 11 : if $i = 6$

Step 11.1 : Initialize $t_marks = 50$, $t_credit = 2$, $c[i] = 2$

Step 11.2 : Display "BASIC WORKSHOP AND PRACTICE"

Step 11.3 : Display "Enter your marks out of 50"

Step 11.4 : Read t

Step 11.5 : Calling function by value : $t_percentage = percent(t, t_marks)$

Step 11.6 : Calling function by value : t_pointer =grade (t_percentage)

Step 11.7 : Display "Enter your term work marks (out of 25)"

Step 11.8 :p[i]=t_pointer

goto step 12

Step 12 : i=i+1

Step 13: Display pointer per subject

ALGORITHM FOR CALCULATION OF PERCENTAGE

Step 1 : float percent(int amarks ,int tmarks)

Step 2 : Declare per

Step 3 :per =(float)(amarks*100/tmarks)

return per

ALGORITHM FOR CALCULATION OF GRADE

Step 1 : int grade(float persen)

Step 2 :if persen>=80 , then return 10

Step 2.1 :else if persen>=75 , then return 9

Step 2.2:else if persen>=70 , then return 8

Step 2.3:else if persen>=60, then return 7

Step 2.4:else if persen>=50 , then return 6

Step 2.5:else if persen>=45 , then return 5

Step 2.6:else if persen>=40 , then return 4

Step 2.7:else return 0

ALGORITHM FOR CALCULATION OF FINAL POINTER

Step 1 : void tot_pointer (int p[],int c[])

Step 2 :Declare i,mul=0,sum=0,point

Step 3 :Repeat following step for i=0 to i<7

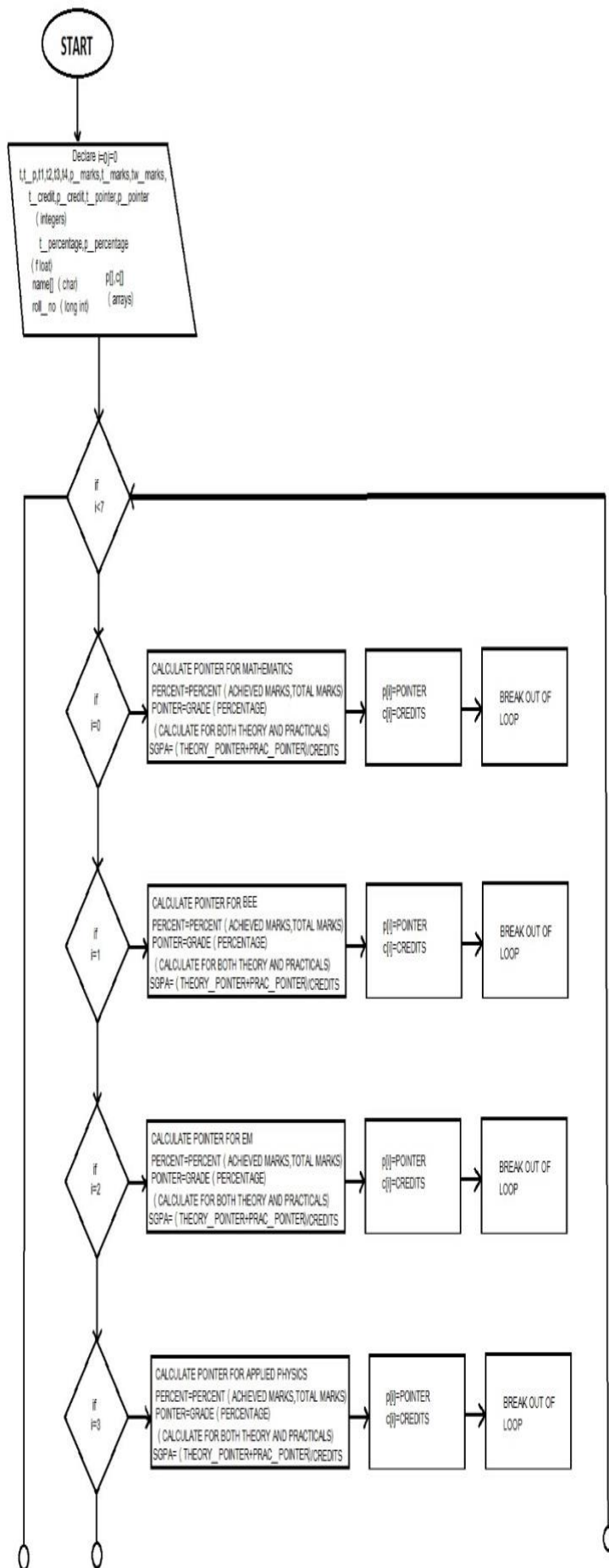
mul=mul+p[i]*c[i]

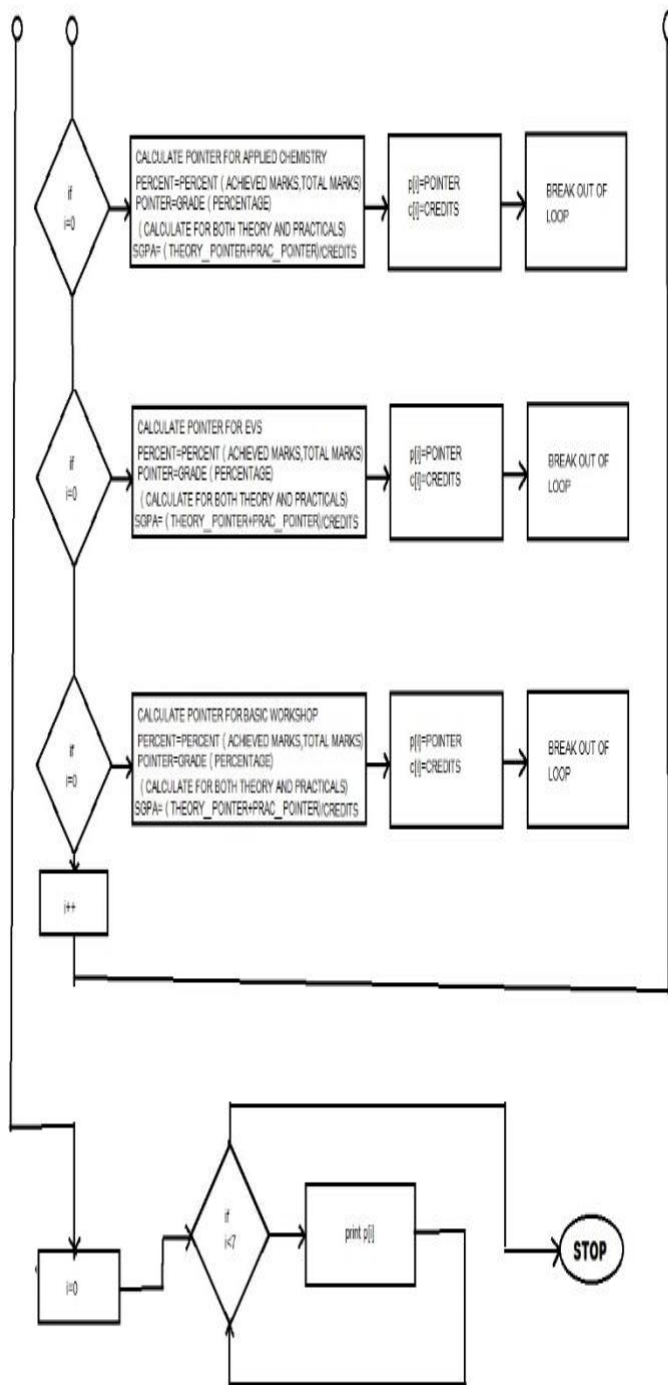
Step 4: Repeat following for i=0 to i<7

sum=sum+p[i]*c[i]

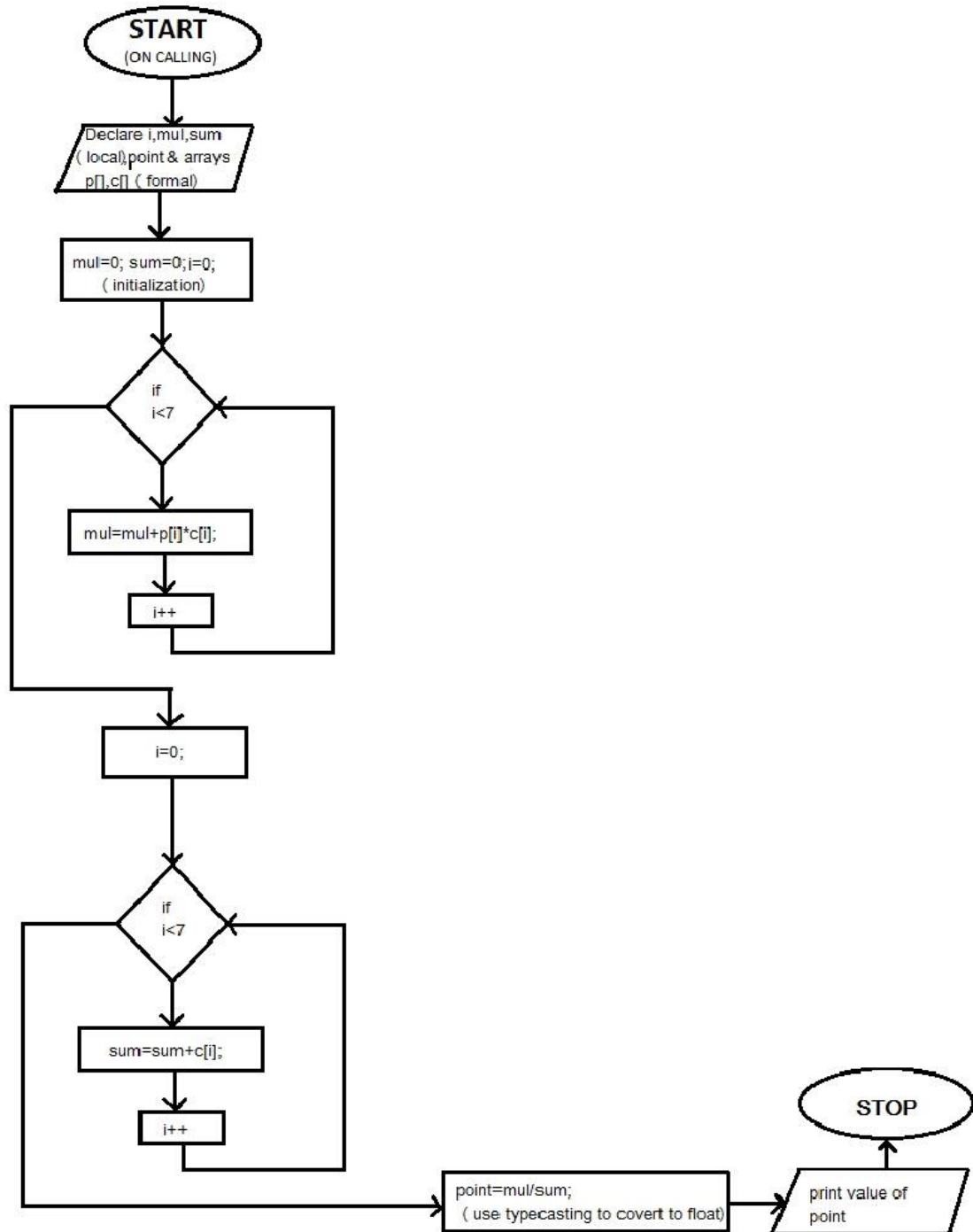
Step 5 : $\text{point} = (\text{float})\text{mul}/\text{sum}$

Step 6 : Display point

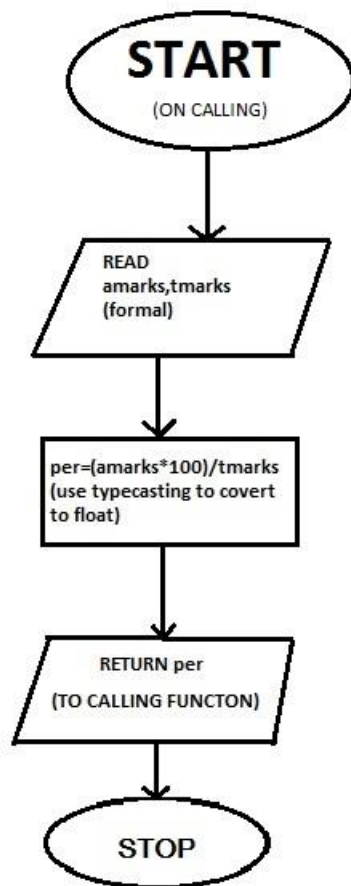




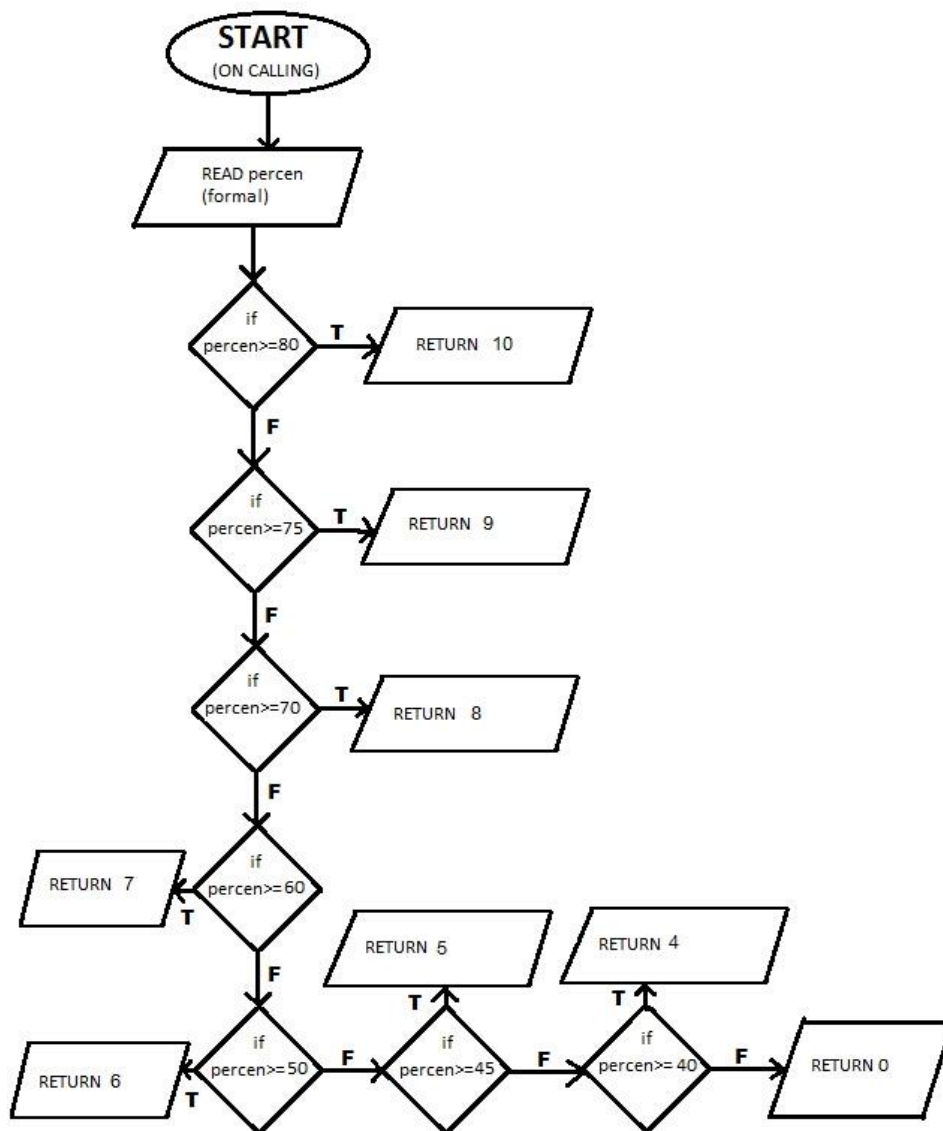
FLOWCHART FOR TOT_POINTER ()



FLOWCHART FOR PERCENT()



FLOWCHART FOR GRADE()



SOURCE CODE

```
#include<stdio.h>

#include<stdio.h>

float percent(int,int);

int grade(float);

void tot_pointer(int p[],int c[]);

void main()

{int i,j=0,p[7],c[7],t,t_p,t1,t2,t3,t4,p_marks,t_marks,tw_marks,t_credit,p_credit,t_pointer,p_pointer;

float t_percentage,p_percentage;

char name[20];

long int roll_no;

printf("\t\t*****MUMBAI UNIVERSITY***** \n\tChoice Based Credit and Grading System
(CBCGS) \n");

printf(" NAME: ");

scanf("%s",name);

printf(" Roll no : ");

scanf("%ld",&roll_no);

for(i=0;i<7;i++)

    {switch(i)

        {case 0:{tw_marks=25;t_marks=100;

                    t_credit=4;p_credit=1;

                    c[i]=5;

                    printf("\nMATHEMATICS:\n");

                    printf("Enter your marks out of 80:");

                    scanf("%d",&t1);

                    printf("Enter your internal assessment marks(out of 20):");

                    scanf("%d",&t2);

                    t=t1+t2;
```

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        t_percentage=percent(t,t_marks);

        t_pointer=grade(t_percentage);

        printf("Enter your term work marks(out of 25):");

        scanf("%d",&t3);

        p_percentage=percent(t3,tw_marks);

        p_pointer=grade(p_percentage);

        if(t_pointer==0 || p_pointer==0)

        {p[i]=0;}

        else

        {p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit+p_credit);}break;

    case 1:{tw_marks=25;t_marks=100;p_marks=25;

        t_credit=4;p_credit=1;

        c[i]=5;

        printf("\nBASIC ELECTRICAL ENGINEERING:\n");

        printf("Enter your marks out of 80:");

        scanf("%d",&t1);

        printf("Enter your internal assessment marks(out of 20):");

        scanf("%d",&t2);

        t=t1+t2;

        t_percentage=percent(t,t_marks);

        t_pointer=grade(t_percentage);

        printf("Enter your term work marks(out of 25):");

        scanf("%d",&t3);

        printf("Enter your practica/viva marks(out of 25):");

        scanf("%d",&t4);

        t_p=t3+t4;

        p_percentage=percent(t_p,(tw_marks+p_marks));

```

```

        p_pointer=grade(p_percentage);

        if(t_pointer==0 || p_pointer==0)

            {p[i]=0;}

else{p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit+p_credit);}break;

    case 2:{tw_marks=25;t_marks=100;p_marks=25;

        t_credit=5;p_credit=1;

        c[i]=6;

        printf("\nENGINEERING MECHANICS:\n");

        printf("Enter your marks out of 80:");

        scanf("%d",&t1);

        printf("Enter your internal assessment marks(out of 20):");

        scanf("%d",&t2);

        t=t1+t2;

        t_percentage=percent(t,t_marks);

        t_pointer=grade(t_percentage);

        printf("Enter your term work marks(out of 25):");

        scanf("%d",&t3);

        printf("Enter your practica/viva marks(out of 25):");

        scanf("%d",&t4);

        t_p=t3+t4;

        p_percentage=percent(t_p,(tw_marks+p_marks));

        p_pointer=grade(p_percentage);

        if(t_pointer==0 || p_pointer==0)

            {p[i]=0;}

        else

            {p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit+p_credit);}break;

    case 3:{tw_marks=25;t_marks=75;

```



```

        t_credit=3;p_credit=0.5;

        c[i]=3.5;

        printf("\nAPPLIED PHYSICS 1:\n");

        printf("Enter your marks out of 60:");

        scanf("%d",&t1);

        printf("Enter your internal assessment marks(out of 15):");

        scanf("%d",&t2);

        t=t1+t2;

        t_percentage=percent(t,t_marks);

        t_pointer=grade(t_percentage);

        printf("Enter your term work marks(out of 25):");

        scanf("%d",&t3);

        p_percentage=percent(t3,tw_marks);

        p_pointer=grade(p_percentage);

        if(t_pointer==0 || p_pointer==0)

        {p[i]=0;}

    else

    {p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit+p_credit);}break;

    case 4:{tw_marks=25;t_marks=75;

        t_credit=3;p_credit=0.5;

        c[i]=3.5;

        printf("\nAPPLIED CHEMISTRY 1:\n");

        printf("Enter your marks out of 60:");

        scanf("%d",&t1);

        printf("Enter your internal assessment marks(out of 15):");

        scanf("%d",&t2);

        t=t1+t2;

```

```

        t_percentage=percent(t,t_marks);

        t_pointer=grade(t_percentage);

        printf("Enter your term work marks(out of 25):");

        scanf("%d",&t3);

        p_percentage=percent(t3,tw_marks);

        p_pointer=grade(p_percentage);

        if(t_pointer==0 || p_pointer==0)

        {p[i]=0;}

        else

        {p[i]=(t_pointer*t_credit+p_pointer*p_credit)/(t_credit+p_credit);}break;

    case 5:{t_marks=75;

        t_credit=2;

        c[i]=2;

        printf("\nENVIRONMENTAL STUDIES:\n");

        printf("Enter your marks out of 60:");

        scanf("%d",&t1);

        printf("Enter your internal assessment marks(out of 15):");

        scanf("%d",&t2);

        t=t1+t2;

        t_percentage=percent(t,t_marks);

        t_pointer=grade(t_percentage);

        p[i]=t_pointer;}break;

    case 6:{t_marks=50;

        p_credit=2;

        c[i]=2;

        printf("\nBASIC WORKSHOP AND PRACTICE:\n");

        printf("Enter your marks out of 50:");

```

```

scanf("%d",&t);

t_percentage=percent(t,t_marks);

t_pointer=grade(t_percentage);

p[i]=t_pointer;}break;}}

printf("\nAM-1\tBEE\tEM\tAP-1\tAC-1\tEVS\tWORKSHOP\n");

for(i=0;i<7;i++)

{printf("%d\t",p[i]);}

for(i=0;i<7;i++)

{if(p[i]==0)

{j++;}}

if(j!=0)

{printf("FAIL");

printf("Total pointer=0");}

else

{tot_pointer(p,c);    }}

float percent(int amarks,int tmarks)

{float per;

per=(float)(amarks*100/tmarks);

return per;}

int grade(float persen)

{if(persen>=80)

{return 10;}

else if(persen>=75)

{return 9;}

else if(persen>=70)

{return 8;}

else if(persen>=60)

```

```
{return 7;}

else if(percen>=50)

{return 6;}

else if(percen>=45)

{return 5;}

else if(percen>=40)

{return 4;}

else

{return 0;}}

void tot_pointer(int p[],int c[])

{ int i,mul=0,sum=0;

float point;

for(i=0;i<7;i++)

{mul=mul+p[i]*c[i];}

for(i=0;i<7;i++)

{sum=sum+c[i];}

point=(float)mul/sum;

printf("%.2f",point);}
```

FAIL CASE:

```
C:\Users\Tarang\Desktop\spa mini project\PROGRAM ON IDE(Dev-C++)\Prog... — [icon] [x]

*****MUMBAI UNIVERSITY*****
Choice Based Credit and Grading System (CBCGS)
NAME: AJAY_SHARMA
Roll no : 254861

MATHEMATICS:
Enter your marks out of 80:60
Enter your internal assessment marks(out of 20):15
Enter your term work marks(out of 25):23

BASIC ELECTRICAL ENGINEERING:
Enter your marks out of 80:12
Enter your internal assessment marks(out of 20):12
Enter your term work marks(out of 25):24
Enter your practica/viva marks(out of 25):20

ENGINEERING MECHANICS:
Enter your marks out of 80:40
Enter your internal assessment marks(out of 20):14
Enter your term work marks(out of 25):14
Enter your practica/viva marks(out of 25):22

APPLIED PHYSICS 1:
Enter your marks out of 60:40
Enter your internal assessment marks(out of 15):14
Enter your term work marks(out of 25):20

APPLIED CHEMISTRY 1:
Enter your marks out of 60:33
Enter your internal assessment marks(out of 15):13
Enter your term work marks(out of 25):22

ENVIRONMENTAL STUDIES:
Enter your marks out of 60:40
Enter your internal assessment marks(out of 15):14

BASIC WORKSHOP AND PRACTICE:
Enter your marks out of 50:44

AM-1    BEE    EM    AP-1    AC-1    EUS    WORKSHOP
9       0      6     8       7      8      10      FAILTotal pointer=0
-----
Process exited after 188.4 seconds with return value 15
Press any key to continue . . . _
```

OUTPUT:

PASS CASE:

```
C:\Users\Tarang\Desktop\Miniprojectspa.exe

MUMBAI UNIVERSITY
Choice Based Credit and Grading System (CBCGS)
NAME: AJAY_SHARMA
Roll no : 254861

MATHEMATICS:
Enter your marks out of 80:77
Enter your internal assessment marks(out of 20):18
Enter your term work marks(out of 25):23

BASIC ELECTRICAL ENGINEERING:
Enter your marks out of 80:77
Enter your internal assessment marks(out of 20):18
Enter your term work marks(out of 25):23
Enter your practica/viva marks(out of 25):20

ENGINEERING MECHANICS:
Enter your marks out of 80:60
Enter your internal assessment marks(out of 20):15
Enter your term work marks(out of 25):23
Enter your practica/viva marks(out of 25):22

APPLIED PHYSICS 1:
Enter your marks out of 60:41
Enter your internal assessment marks(out of 15):15
Enter your term work marks(out of 25):24

APPLIED CHEMISTRY 1:
Enter your marks out of 60:56
Enter your internal assessment marks(out of 15):14
Enter your term work marks(out of 25):23

ENVIRONMENTAL STUDIES:
Enter your marks out of 60:50
Enter your internal assessment marks(out of 15):15

BASIC WORKSHOP AND PRACTICE:
Enter your marks out of 50:40

AM-1    BEE    EM    AP-1    AC-1    EUS    WORKSHOP
10      10     9     8       10     10     10      Total pointer=9.54
-----
Process exited after 38.22 seconds with return value 4
Press any key to continue . . .
```

REFERENCES

To make CGPA Calculator for pointers we used

Mumbai University official website : www.mu.ac.in

Oxford publication book for C programming (Reference book)

Mumbai university mark-sheet (semester 1) to understand the CBCGS system