Assignment-10

Write a C Program using structures for the following problem statements:-

The problem statements need to be programmed by
(i) using structure variable
(ii) using typedef
(iii) using array of structures
(iv) using nested structure

1. Enter the marks of 5 students in Chemistry, Mathematics and Physics (each out of 100) using a structure named Marks having elements roll no., name, chem_marks, maths_marks and phy_marks and then display the percentage of each student.

(i) using structure variable

```
#include <stdio.h>
#include<string.h>
struct Marks
{
   int chem_mark,math_mark,phy_mark,rno,percent;
   char name[20];
}s1,s2,s3,s4,s5;
int main()
{
   strcpy(s1.name,"Kriti");
   s1.rno=1;
   s1.chem_mark=87;
   s1.phy_mark=78;
   s1.math_mark=90;
   s1.percent=(s1.chem_mark + s1.phy_mark + s1.math_mark)*100/300;
   printf("name:%s\troll no:%d\tpercent:%d",s1.name,s1.rno,s1.percent);

   strcpy(s2.name,"Priya");
   s2.rno=2;
   s2.chem_mark=89;
   s2.phy_mark=56;
   s2.math_mark=95;
   s2.percent=(s2.chem_mark + s2.phy_mark + s2.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s2.name,s2.rno,s2.percent);

    strcpy(s3.name,"Sarthak");
   s3.rno=3;
   s3.chem_mark=85;
   s3.phy_mark=78;
   s3.math_mark=92;
   s3.percent=(s3.chem_mark + s3.phy_mark + s3.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s3.name,s3.rno,s3.percent);

    strcpy(s4.name,"Komal");
   s4.rno=2;
   s4.chem_mark=89;
   s4.phy_mark=56;
   s4.math_mark=95;
   s4.percent=(s4.chem_mark + s4.phy_mark + s4.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s4.name,s4.rno,s4.percent);

    strcpy(s5.name,"Karan");
   s5.rno=2;
```

```
   s5.chem_mark=65;
   s5.phy_mark=50;
   s5.math_mark=64;
   s5.percent=(s5.chem_mark + s5.phy_mark + s5.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s5.name,s5.rno,s5.percent);
   return 0;
}
```

Output:-

```
name:Kriti      roll no:1       percent:85
name:Priya      roll no:2       percent:80
name:Sarthak    roll no:3       percent:85
name:Komal      roll no:2       percent:80
name:Karan      roll no:2       percent:59
```

ii) Using typedef

```
#include <stdio.h>
#include<string.h>
typedef struct Marks
{
   int chem_mark,math_mark,phy_mark,rno,percent;
   char name[20];
}std1,std2,std3,std4,std5;
int main()
{
   std1 s1;
   std2 s2;
   std3 s3;
   std4 s4;
   std5 s5;
   strcpy(s1.name,"Kriti");
   s1.rno=1;
   s1.chem_mark=87;
   s1.phy_mark=78;
   s1.math_mark=90;
   s1.percent=(s1.chem_mark + s1.phy_mark + s1.math_mark)*100/300;
   printf("name:%s\troll no:%d\tpercent:%d",s1.name,s1.rno,s1.percent);

   strcpy(s2.name,"Priya");
   s2.rno=2;
   s2.chem_mark=89;
   s2.phy_mark=56;
   s2.math_mark=95;
   s2.percent=(s2.chem_mark + s2.phy_mark + s2.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s2.name,s2.rno,s2.percent);

    strcpy(s3.name,"Sarthak");
   s3.rno=3;
   s3.chem_mark=85;
   s3.phy_mark=78;
   s3.math_mark=92;
   s3.percent=(s3.chem_mark + s3.phy_mark + s3.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s3.name,s3.rno,s3.percent);

    strcpy(s4.name,"Komal");
   s4.rno=2;
   s4.chem_mark=89;
   s4.phy_mark=56;
   s4.math_mark=95;
```

```
   s4.percent=(s4.chem_mark + s4.phy_mark + s4.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s4.name,s4.rno,s4.percent);

    strcpy(s5.name,"Karan");
   s5.rno=2;
   s5.chem_mark=65;
   s5.phy_mark=50;
   s5.math_mark=64;
   s5.percent=(s5.chem_mark + s5.phy_mark + s5.math_mark)*100/300;
   printf("\nname:%s\troll no:%d\tpercent:%d",s5.name,s5.rno,s5.percent);
   return 0;
}
```

Output:-

```
name:Kriti      roll no:1       percent:85
name:Priya      roll no:2       percent:80
name:Sarthak    roll no:3       percent:85
name:Komal      roll no:2       percent:80
name:Karan      roll no:2       percent:59
```

iii) using array of structures

```
#include <stdio.h>
struct Marks
{
   int chem_mark,math_mark,phy_mark,rno,percent;
   char name[20];
};
int main()
{
   struct Marks mk[5];
   int i;
   printf("enter the name,roll no,chemistry,physics and maths marks: ");
   for(i=0;i<5;i++)
   {
   scanf("%s %d %d %d %d",mk[i].name,&mk[i].rno,&mk[i].chem_mark,&mk[i].phy_mark,&mk[i].math_mark);
   }
   printf("printing the details of student\n ");

   for(i=0;i<5;i++)
   {
      mk[i].percent=(mk[i].chem_mark + mk[i].phy_mark + mk[i].math_mark)*100/300;
   printf("name:%s\troll
no:%d\tchem_mark:%d\tphy_mark:%d\tmath_mark:%d\t.percent:%d%\n",mk[i].name,mk[i].rno,mk[i].chem_mark,mk[i].phy_
mark,mk[i].math_mark,mk[i].percent);
   }
   return 0;

}
```

Output:-

```
enter the name,roll no,chemistry,physics and maths marks: kriti 1 89 78 87
sonali 2 67 89 87
komal 3 87 89 87
Ravi 4 98 87 90
kajal 5 87 67 55
printing the details of student
 name:kriti     roll no:1       chem_mark:89    phy_mark:78     math_mark:87
percent:84%
name:sonali     roll no:2       chem_mark:67    phy_mark:89     math_mark:87
percent:81%
name:komal      roll no:3       chem_mark:87    phy_mark:89     math_mark:87
percent:87%
name:Ravi       roll no:4       chem_mark:98    phy_mark:87     math_mark:90
percent:91%
name:kajal      roll no:5       chem_mark:87    phy_mark:67     math_mark:55
percent:69%
```

(iv) using nested structure

```
#include <stdio.h>
struct details
{
   //int chem_mark,math_mark,phy_mark,rno,percent;
   char name[20];
   int rno;
   struct marks
   {
      int chem_mark,math_mark,phy_mark,percent;
   }mk;
}dt;
int main()
{
   struct details dt[5];
   int i;
   printf("enter the name,roll no,chemistry,physics and maths marks: ");
   for(i=0;i<5;i++)
   {
   scanf("%s %d %d %d %d",dt[i].name,&dt[i].rno,&dt[i].mk.chem_mark,&dt[i].mk.phy_mark,&dt[i].mk.math_mark);
   }
   printf("printing the details of student\n ");

   for(i=0;i<5;i++)
   {
      dt[i].mk.percent=(dt[i].mk.chem_mark + dt[i].mk.phy_mark + dt[i].mk.math_mark)*100/300;
   printf("name:%s\troll
no:%d\tchem_mark:%d\tphy_mark:%d\tmath_mark:%d\t.percent:%d%\n",dt[i].name,dt[i].rno,dt[i].mk.chem_mark,dt[i].mk.ph
y_mark,dt[i].mk.math_mark,dt[i].mk.percent);
   }
   return 0;

}
```

Output:-

```
enter the name,roll no,chemistry,physics and maths marks: kriti 1 87 67 89
priya 2 87 56 89
Ananya 3 90 88 76
Shivam 4 98 6 55
Kartik 5 89 98 77
printing the details of student
 name:kriti     roll no:1       chem_mark:87    phy_mark:67     math_mark:89
percent:81%
name:priya      roll no:2       chem_mark:87    phy_mark:56     math_mark:89
percent:77%
name:Ananya     roll no:3       chem_mark:90    phy_mark:88     math_mark:76
percent:84%
name:Shivam     roll no:4       chem_mark:98    phy_mark:6      math_mark:55
percent:53%
name:Kartik     roll no:5       chem_mark:89    phy_mark:98     math_mark:77
percent:88%
```

3. Write a structure to store the name, account number and balance of customers (more than 10) and store their information.
 - print the names of all the customers having balance less than $200.
 - add $100 in the balance of all the customers having more than $1000 in their balance and
then print the incremented value of their balance.

(i) using structure variable

```
#include<stdio.h>
struct Details
{
   char name[20];
   int a_no,balance;
```

```
};
int main()
{
   struct Details s1;

   printf("enter the name,account no and balance of 1st customer: ");
   scanf("%s %d %d",s1.name,&s1.a_no,&s1.balance);


   struct Details s2;
   printf("enter the name,account no and balance of 2nd customer: ");
   scanf("%s %d %d",s2.name,&s2.a_no,&s2.balance);

   struct Details s3;
   printf("enter the name,account no and balance of 3rd customer: ");
   scanf("%s %d %d",s3.name,&s3.a_no,&s3.balance);


   struct Details s4;
   printf("enter the name,account no and balance of 4th customer: ");
   scanf("%s %d %d",s4.name,&s4.a_no,&s4.balance);


   struct Details s5;
   printf("enter the name,account no and balance of 1st customer: ");
   scanf("%s %d %d",s5.name,&s5.a_no,&s5.balance);



    if(s1.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s1.name);
}
else if(s1.balance>1000)
{
   printf("incremented balance of %s customer:%d \n",s1.name,s1.balance+100);
}

     if(s2.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s2.name);
}
else if(s2.balance>1000)
{
   printf("incremented balance of %s customer:%d \n",s2.name,s2.balance+100);
}

if(s3.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s3.name);
}

else if(s3.balance>1000)
{
   printf("incremented balance of %s customer:%d\n",s3.name,s3.balance+100);
}
```

```
if(s4.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s4.name);
}
else if(s4.balance>1000)
{
   printf("incremented balance of %s customer:%d\n",s4.name,s4.balance+100);
}

    if(s5.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s5.name);
}
 else if(s5.balance>1000)
{
   printf("incremented balance of %s customer:%d\n",s5.name,s5.balance+100);
}


return 0;
}
```

Output:-

```
enter the name,account no and balance of 1st customer: sonali 1234 120
enter the name,account no and balance of 2nd customer: sandhya 123 9800
enter the name,account no and balance of 3rd customer: kartik 3567 400
enter the name,account no and balance of 4th customer: kriti 1222 1500
enter the name,account no and balance of 1st customer: sreyansh 1122 180
name of customers:sonali because balance is < 200
incremented balance of sandhya customer:9900
incremented balance of kriti customer:1600
name of customers:sreyansh because balance is < 200
```

ii)using typedef

```
#include<stdio.h>
typedef struct Details
{
   char name[20];
   int a_no,balance;
}std1,std2,std3,std4,std5;
int main()
{
   //struct Details std1;
   std1 s1;
   printf("enter the name,account no and balance of 1st customer: ");
   scanf("%s %d %d",s1.name,&s1.a_no,&s1.balance);


   //struct Details std2;
   std2 s2;
   printf("enter the name,account no and balance of 2nd customer: ");
   scanf("%s %d %d",s2.name,&s2.a_no,&s2.balance);

  // struct Details std3;
   std3 s3;
   printf("enter the name,account no and balance of 3rd customer: ");
   scanf("%s %d %d",s3.name,&s3.a_no,&s3.balance);
```

```
   //struct Details std4;
   std4 s4;
   printf("enter the name,account no and balance of 4th customer: ");
   scanf("%s %d %d",s4.name,&s4.a_no,&s4.balance);


   //struct Details std5;
   std5 s5;
   printf("enter the name,account no and balance of 1st customer: ");
   scanf("%s %d %d",s5.name,&s5.a_no,&s5.balance);



    if(s1.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s1.name);
}
else if(s1.balance>1000)
{
   printf("incremented balance of %s customer:%d \n",s1.name,s1.balance+100);
}

     if(s2.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s2.name);
}
else if(s2.balance>1000)
{
   printf("incremented balance of %s customer:%d \n",s2.name,s2.balance+100);
}

if(s3.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s3.name);
}

else if(s3.balance>1000)
{
   printf("incremented balance of %s customer:%d\n",s3.name,s3.balance+100);
}

if(s4.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s4.name);
}
else if(s4.balance>1000)
{
   printf("incremented balance of %s customer:%d\n",s4.name,s4.balance+100);
}

    if(s5.balance<200)
{
   printf("name of customers:%s because balance is < 200\n",s5.name);
}
 else if(s5.balance>1000)
```

```
{
   printf("incremented balance of %s customer:%d\n",s5.name,s5.balance+100);
}


return 0;
}
```

Output:-

```
enter the name,account no and balance of 1st customer: Raunak 1222 1500
enter the name,account no and balance of 2nd customer: sonali 4555 1100
enter the name,account no and balance of 3rd customer: kriti 1122 120
enter the name,account no and balance of 4th customer: koma 2345 300
enter the name,account no and balance of 1st customer: sakshi 2332 180
incremented balance of Raunak customer:1600
incremented balance of sonali customer:1200
name of customers:kriti because balance is < 200
name of customers:sakshi because balance is < 200
```

(iii) using array of structures

```
#include <stdio.h>
struct Details
{
   char name[20];
   int a_no,balance;
}dt[5];
int main()
{
   int i;
   for(i=0;i<5;i++)
   {
    printf("enter the name,account no and balance of customer: ");
   scanf("%s %d %d",dt[i].name,&dt[i].a_no,&dt[i].balance);
   }
   for(i=0;i<5;i++)
   {
      if(dt[i].balance<200)
{
   printf("name of customers:%s because balance is < 200\n",dt[i].name);
}
else if(dt[i].balance>1000)
{
   printf("incremented balance of %s customer:%d \n",dt[i].name,dt[i].balance+100);
}

   }
   return 0;
}
```

Output:-

```
enter the name,account no and balance of customer: kriti 1122 190
enter the name,account no and balance of customer: sonali 3509 1200
enter the name,account no and balance of customer: saubhagya 3344 400
enter the name,account no and balance of customer: kartik 1234 150
enter the name,account no and balance of customer: shivani 5676 250
name of customers:kriti because balance is < 200
incremented balance of sonali customer:1300
name of customers:kartik because balance is < 200
```

(iv) using nested structure

```
#include <stdio.h>
struct Details
{
```

```
   char name[20];
   //int a_no,balance;
   struct customer
   {
     int a_no,balance;
   }ct;
}dt;
int main()
{
   struct Details dt[5];
   int i;
   for(i=0;i<5;i++)
   {
    printf("enter the name,account no and balance of customer: ");
   scanf("%s %d %d",dt[i].name,&dt[i].ct.a_no,&dt[i].ct.balance);
   }
   for(i=0;i<5;i++)
   {
       if(dt[i].ct.balance<200)
{
   printf("name of customers:%s because balance is < 200\n\n",dt[i].name);
}
else if(dt[i].ct.balance>1000)
{
   printf("incremented balance of %s customer:%d \n\n",dt[i].name,dt[i].ct.balance+100);
}

   }
   return 0;
}
```

Output:-