Chapter - 6 : Functions

Structures and Functions

In C, structure can be passed to functions by two methods:

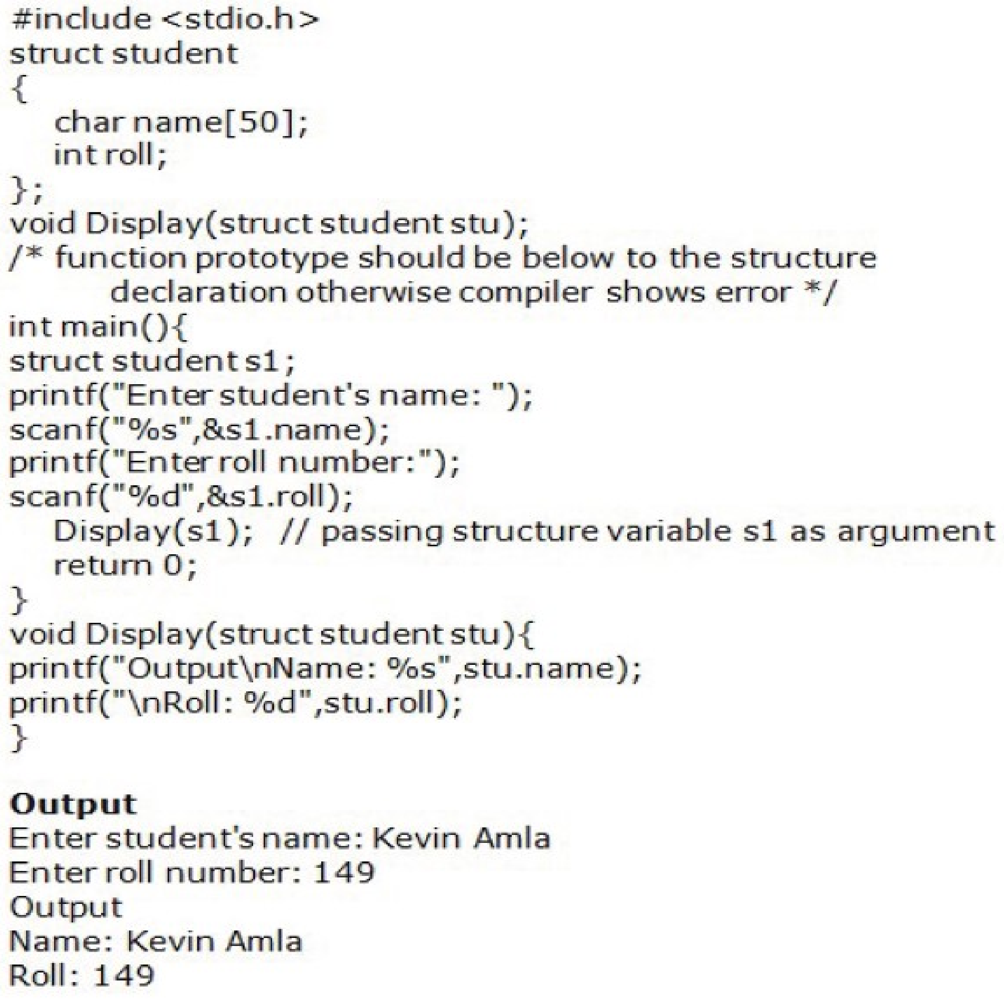
- Passing by value (passing actual value as argument).
- Passing by reference (passing address of an argument).

Passing Structure by Value

- A structure variable can be passed to the function as an argument as normal variable.
- If structure is passed by value, change made in structure variable in function definition does not reflect in original structure variable in calling function.

Example

Write a C program to create a structure student, containing name and roll. Ask user the name and roll of a student in main function. Pass this structure to a function and display the information in that function.



```
#include <stdio.h>
struct student
{
    char name[50];
    int roll;
};
void Display(struct student stu);
/* function prototype should be below to the structure
        declaration otherwise compiler shows error */
int main(){
struct student s1;
printf("Enter student's name: ");
scanf("%s",&s1.name);
printf("Enter roll number:");
scanf("%d",&s1.roll);
    Display(s1);  // passing structure variable s1 as argument
    return 0;
}
void Display(struct student stu){
printf("Output\nName: %s",stu.name);
printf("\nRoll: %d",stu.roll);
}
```

Output

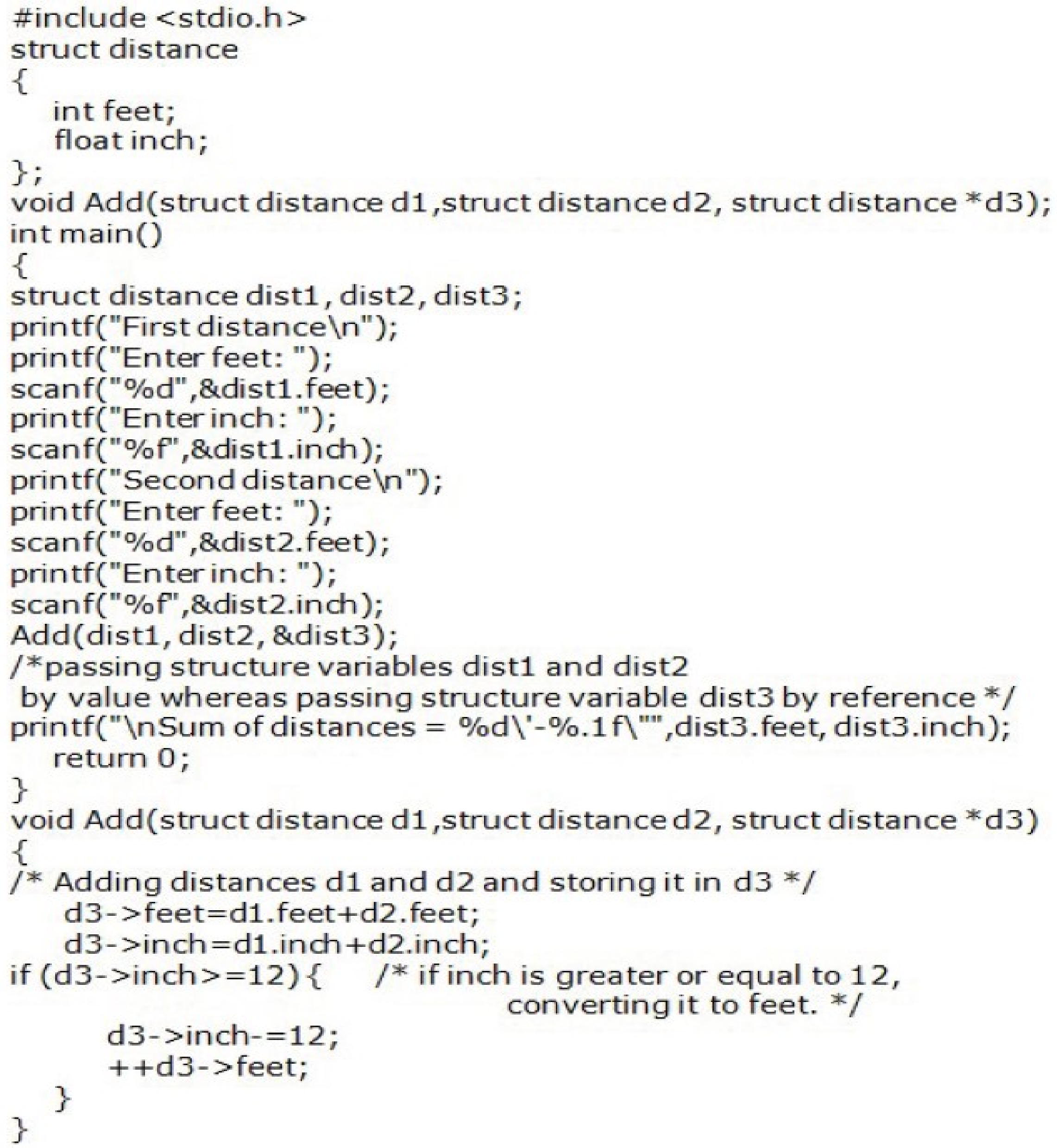
```
Enter student's name: Kevin Amla
Enter roll number: 149
Output
Name: Kevin Amla
Roll: 149
```

Passing Structure by Reference

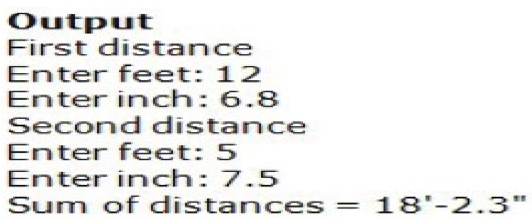
- The address location of structure variable is passed to function while passing it by reference.
- If structure is passed by reference, change made in structure variable in function definition reflects in original structure variable in the calling function.

Example

Write a C program to add two distances(feet-inch system) entered by user. To solve this program, make a structure. Pass two structure variable (containing distance in feet and inch) to add function by reference and display the result in main function without returning it.



```
#include <stdio.h>
struct distance
{
   int feet;
   float inch;
};
void Add(struct distance d1,struct distance d2, struct distance *d3);
int main()
{
struct distance dist1, dist2, dist3;
printf("First distance\n");
printf("Enter feet: ");
scanf("%d",&dist1.feet);
printf("Enter inch: ");
scanf("%f",&dist1.inch);
printf("Second distance\n");
printf("Enter feet: ");
scanf("%d",&dist2.feet);
printf("Enter inch: ");
scanf("%f",&dist2.inch);
Add(dist1, dist2, &dist3);
/*passing structure variables dist1 and dist2
 by value whereas passing structure variable dist3 by reference */
printf("\nSum of distances = %d\'-%.1f\"",dist3.feet, dist3.inch);
   return 0;
}
void Add(struct distance d1,struct distance d2, struct distance *d3)
{
/* Adding distances d1 and d2 and storing it in d3 */
    d3->feet=d1.feet+d2.feet;
    d3->inch=d1.inch+d2.inch;
if (d3->inch>=12){     /* if inch is greater or equal to 12,
                                converting it to feet. */
       d3->inch-=12;
       ++d3->feet;
   }
}
```



Output

```
First distance
Enter feet: 12
Enter inch: 6.8
Second distance
Enter feet: 5
Enter inch: 7.5
Sum of distances = 18'-2.3"
```

Example

Write a program to read the record of the student and display the student detail.

- Structure of student have the member as name , age and contact_no
- The function display(student) accepts the structure as argument.

```
#include <stdio.h>
struct student
{    char name[30];
     int age;
     int contact_no;
};

// function prototype - to display the student detail
void display(struct student s);

void  main()
{
   struct student s1;

   printf("Enter name: ");
   gets(s1.name);

   printf("Enter age: ");
   scanf("%d", &s1.age);

   printf("Enter Contact No: ");
   scanf("%d", &s1.contact_no);

   display(s1);   // passing struct as an argument

}

void display(struct student s)
{
        printf("\nDisplaying information\n");
        printf("Name: %s", s.name);
        printf("\nAge: %d", s.age);
        printf("\nContact No: %d", s.contact_no);
}
```

Output

```
Enter name: Ajay
Enter age:30
Enter Contact No: 456788

Displaying information
Name: Ajay
Age: 30
Contact No: 456788
```

Example

Write a program to read the record of the student and display the student detail.

- Structure of student have the member as name , age and contact_no
- The function getDetail( ) reads the student detail and return the student record.

```
#include <stdio.h>
struct student
{
   char name[30];
   int age;
   int contact_no;
};

// function prototype – to read the student detail and return the student record
struct student getDetail();

void  main()
{
   struct student s;

   s = getDetail();

   printf("\nDisplaying information\n");
   printf("Name: %s", s.name);
   printf("\nRoll: %d", s.age);
   printf("\nContact No: %d", s.contact_no);

}
struct student getDetail()
{
   struct student s1;

   printf("Enter name: ");
   gets(s1.name);

   printf("Enter age: ");
   scanf("%d", &s1.age);

   printf("Enter Contact No: ");
   scanf("%d", &s1.contact_no);

   return s1;
}
```