

C Programming

Class- BCA IInd Semester



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Outline

unit 4 : Union

- Union
- Initializing Unions
- Difference between Structure & Union

Union

A **union** is a derived data type available in C like structure and it also contain member of different data type and allow us to store them in the same memory location. We can define a union with multiple members, but only one member can contain a value at a time. It also provides an efficient way of using the same memory location for multiple-purpose. The syntax of union are as follows-

```
union number  
{  
    int x;  
    float y;  
    char str[15];  
};
```

So the memory size occupied by the number union will be 15 byte but if we take a structure of same type it take 21 byte of memory.

Example

```
#include<stdio.h>
#include<string.h>
typedef struct employee
{
    char name[50];
    int salary;
}emp;

int main( )
{
    emp e1;
    printf("\nEmployee name:\t");
    scanf("%s", e1.name);
    printf("\nEnter Employee salary: \t");
    scanf("%d", &e1.salary);
    printf("\nstudent name is %s", e1.name);
    printf("\nroll is %d", e1.salary);
    return 0;
}
```

Example

```
#include <string.h>
typedef struct student
{
    int id;
    char name[20];
    float percentage;
} status;

int main()
{
    status record;
    record.id=1;
    strcpy(record.name, "Raju");
    record.percentage = 86.5;
    printf(" Id is: %d \n", record.id);
    printf(" Name is: %s \n", record.name);
    printf(" Percentage is: %f \n", record.percentage);
    return 0;
}
```

Example

```
#include <stdio.h>
#include <string.h>
struct student_str //normal structure declaration
{
    char name[30];
    int age;
};
typedef struct { //structur declaration with typedef
    char name[30];
    int age;
}emp_str;
int main()
{
    struct student_str std;
        emp_str emp;
    strcpy(std.name, "Amit Shukla"); //assign values to std
    std.age = 21;
    strcpy(emp.name, "Abhishek Jain"); //assign values to emp
    emp.age = 27;
    printf("Student detail:\n");
    printf("Name: %s\n",std.name);
    printf("Age: %d\n",std.age);
    printf("Employee detail:\n");
    printf("Name: %s\n",emp.name);
    printf("Age: %d\n",emp.age);
    return 0;
}
```

Initializing Unions

The difference between a structure and a union is that in case of a union, the fields share the same memory space, so new data replaces any existing data.

```
union Data
{
int i;
float f;
char str[20];
};
int main( )
{
union Data d;
data.i = 10;
printf( "d.i : %d\n", d.i);
data.f = 220.5;
printf( "d.f : %f\n", d.f);
strcpy( d.str, "C Programming");
printf( "d.str : %s\n", d.str);
return 0;
}
```

Initializing Unions

```
typedef struct POINT1
{
int x, y;
};
typedef union POINT2
{
int x;
int y;
};
int main()
{
POINT1 P1 = {2,3};    /*POINT2 P2 ={4,5}; Illegal in case of unions*/
POINT2 P2;
P2.x = 4;
P2.y = 5;
printf("\n The coordinates of P1 are %d and %d", P1.x, P1.y);
printf("\n The coordinates of P2 are %d and %d", P2.x, P2.y);
return 0;
}
```

Output

The coordinates of P1 are 2 and 3

The coordinates of P2 are 5 and 5

Difference between Structure & Union

Structure	Union
<p>In structure each member get separate space in memory.</p> <pre>struct Student { char[15] name; int rollno; int age; }s1;</pre> <p>Therefore total memory required for structure is equal to the sum of the size of all the members that is 19 byte.</p>	<p>But in union, the total memory space is equal to the member with largest size and all other members of union share the same memory space. This is the main difference between structure and union.</p> <pre>union student { char[15] name; int rollno; int age; }s1;</pre> <p>Therefore total memory required for structure union is 15bytes.</p>
<p>We can access any member in any sequence.</p>	<p>We can access only that variable whose value is recently used.</p>

Exercise

1. What is the advantage of a union over a structure? Where are unions used?
2. Develop a program in c using union to read the following information from the keyboard.
employee name
employee code
designation
age
3. Write a program to assign some values to union members. Display it on the screen using the union tag.
4. Create a union to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 200 customers in the bank.
5. Write a program to retrieve information on parts with serial numbers between BB1 and CC6.

References

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Thanks