Structure

Discussion

- How is your data stored in college database?
- What datatypes will you use?

What is a structure

- int float and char were pretty simple ;)
- Structure is a collection of such ints, floats and chars
- Helps in modeling real world problems and objects better

Question: How will you describe yourself in code?

Why use them?

- Collection of dissimilar data
- More intuitive representation

Eg:

```
struct book
{
char name ;
float price ;
int pages ;
} ;
```

Remember

- Closing brace is followed by a semi-colon
- Reserves no space in memory unless initialized
- Sometimes stored in external files and then included in all the files that need them
- ‘.’ operator is used to access structure elements

Eg: nilesh.age Output: 200 ;)

Array of structures

- Array of similar data types which themselves are collection of dissimilar data types

Syntax:

struct book b1[100]

Explanation:

b1 is an array of 100 book stucts

Additional features of structures

- Value of one struct can be copied into another struct directly by using the assignment operator
- stucts can be nested
- Structures can be passed to functions like variables
- We can have structure pointers
- -> operator is used to access contents of structures by pointers

Uses

- Database management
- Size of cursor
- Input from keyboard
- Interacting with mouse
- Sending output to printer
- Drawing graphics on the screen

In short lots and lots of applications use structures

Union and Enum

- Union: Shared memory
- Enum: Collection of values

Summary

- A structure is usually used when we wish to store dissimilar data together.
- Structure elements can be accessed through a structure variable using a dot (.) operator.
- Structure elements can be accessed through a pointer to a structure using the arrow (->) operator.
- All elements of one structure variable can be assigned to another structure variable using the assignment (=) operator.
- It is possible to pass a structure variable to a function either by value or by address.
- It is possible to create an array of structures.

Questions

- Error in this?

```
struct emp
{int ecode;
struct emp e;}
```

- Error in this?

```
struct emp
{int ecode;
struct emp *e;}
```

- struct value { int bit1 : 4; int bit2: 5; } bit;

  printf (sizeof(bit));

- Output:

struct value{ int bit1: 1; int bit2: 4; int bit3: 4;}

bit ={1,2,2};

print(bit.bit1,bit.bit2,bit.bit3);

- What is wrong here?

struct s {.....}

main() {.....}

- int i=4, j=8;

printf (i|j&j|I, i|j&&j|I, i^j)

Answers

- The compiler gives error because it has no clue of the size of emp struct before it is fully formed
- No error because the compiler already knows the size of pointer.
- 2
- -1 2 2
- The missing semicolon
- 12 1 12

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