Summary DSA

Sessions No 07(20-12-2022)

- In C++, there are 2 ways available for memory allocation.
  1) **Compile time memory allocation :**

     When a variable is declared, the compiler automatically allocates memory for it. This is known as compile time memory allocation.

     Compile time allocation is also known as **static memory allocation**.

     All variables declared inside any function take up the stack's memory.

  2) **Run time memory allocation :**

     Memory can be allocated for data variables after the program begins execution. This is known as runtime memory allocation.

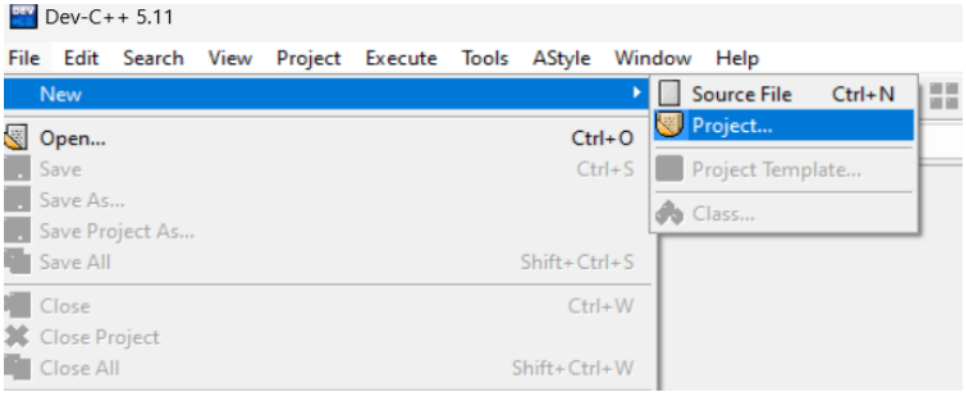
     Run time allocation is also known as **dynamic memory allocation**.

     Heap Memory is used for dynamic memory allocation.

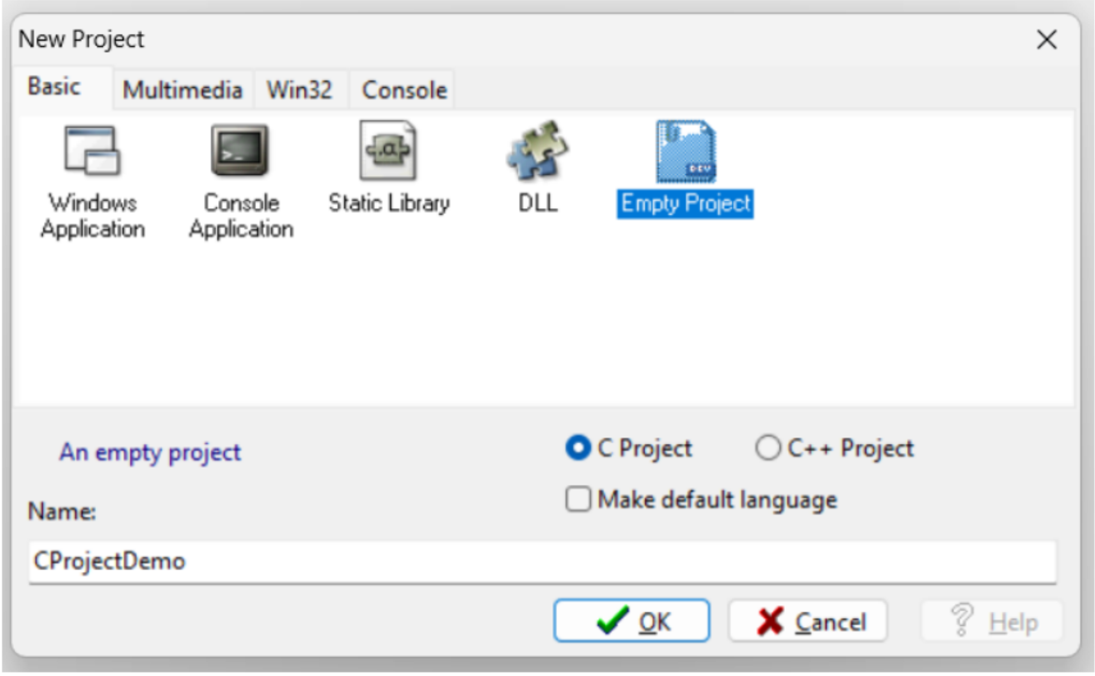
- In memory, data will store in 2 ways
  1) **Continuous** : Single contiguous section/part of memory is allocated to a process Eg. Array
  2) **Noncontinuous** : Allocates the memory space in different locations to the process as per its requirements Eg. Linked List

- **Demo of C Programming Language**:

1) For this create project :



2) Select C Project with Empty Project then give name for project.



An empty project

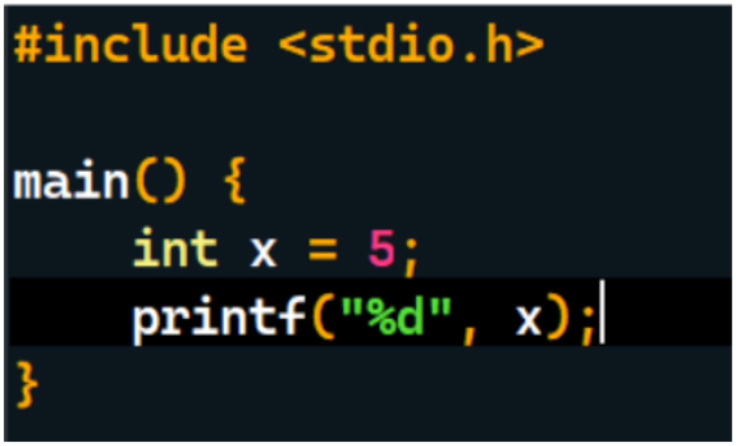
● C Project ○ C++ Project

□ Make default language

Name:

CProjectDemo

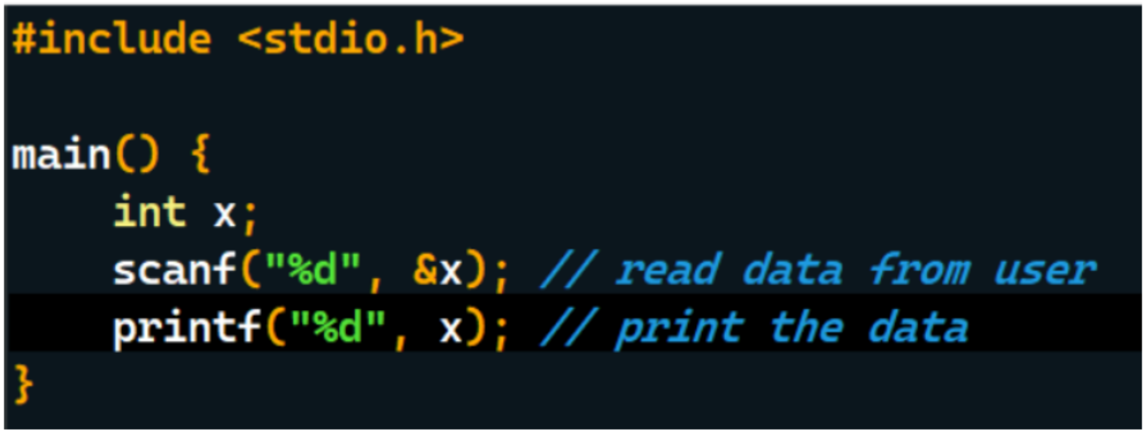
- For printing in C, *printf()* function is used. And this function comes from the *stdio.h* library. In function we have to pass a total of 2 parameters. One is the format specifier which tells which type of data we have to print and the other is variable name.



```
#include <stdio.h>

main() {
    int x = 5;
    printf("%d", x);
}
```

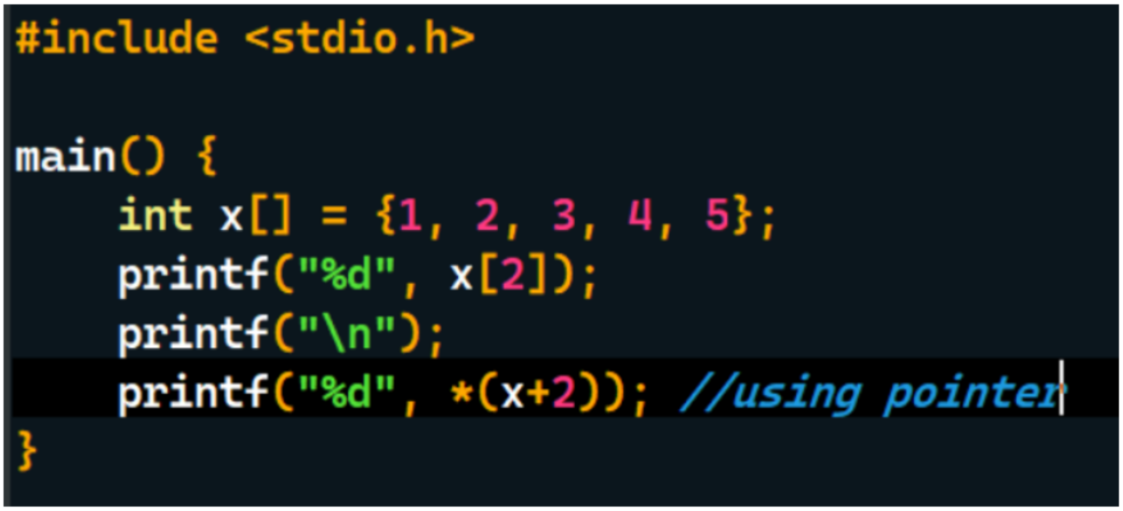
- For reading data from the console in C, *scanf()* function is used. For this we have to pass a total of 2 parameters. One is the format specifier which tell which type of data we have to pass and other is address of variable where we store the data.



```
#include <stdio.h>

main() {
    int x;
    scanf("%d", &x); // read data from user
    printf("%d", x); // print the data
}
```

- Array we can create the same as we create in C++. For accessing array elements we can also used pointer.



```c
#include <stdio.h>

main() {
    int x[] = {1, 2, 3, 4, 5};
    printf("%d", x[2]);
    printf("\n");
    printf("%d", *(x+2)); //using pointer
}
```

- Using the index value, we can access the array elements in constant time. So the ***time complexity is O(1) ie. constant*** for accessing an element in the array.