String (1D array of characters)

String is a character array that is terminated with null. Null is zero and can be expressed as NULL or '\0'. The compiler adds the null to the end of string automatically.

For example:
```
char name[11];    // holds 10 characters plus null
char str[12]= {'H','e','l','l','o',' ','t','h',
               'e','r','e'};
```
or
```
char str[12] = "Hello there";  //string constant plus
                               // null
```

str | H | e | l | l | o | | t | h | e | r | e | 0 |

We can input and output the string with or without using loop.
```
cout << "Enter your name: ";
for(int i=0; i<11; i++)
 cin >> name[i];
```
or
```
cout << "Enter your name: ";
cin >> name;


cout << "Your name is " << name << endl;
```

Example: Write a C++ program that reads a string and then computes the number of capital letters in the string.
```
#include <iostream>
using namespace std;
int main()
{
  char str[30];
  int count = 0;
  cout<<"Enter your string: ";
  cin >> str;
  for(int i=0 ; str[i] ; i++)
   if(str[i] >= 'A' && str[i] <= 'Z')
      count++;
  cout<<"No. of capital letters is " << count;
  return 0;}
```

Example: Write a C++ program that computes the length of a string entered by the user.

```cpp
#include <iostream>
using namespace std;
int main()
{
   char str[100];
   int length = 0;
   cout<<"Enter your string: ";
   cin >> str;
   for(int i=0; str[i] ; i++)
     length++;
   cout<<"Length of string is " << length;
    return 0;
}
```

Example: Write a C++ program that converts any capital letter to small in a string entered by the user.

```cpp
#include <iostream>
using namespace std;
int main()
{
   char str[20];
   cout<<"Enter your string: ";
   cin >> str;
   for (int i=0 ; str[i] ; i++)
     if(str[i] >= 'A' &&   str[i] <= 'Z')
       str[i] += 32;
   cout <<"\nConverted String: " << endl << str;
    return 0;
}
```

Array of strings (2D array of characters)

To create an array of strings, we use a two-dimensional character array.

The number of rows determines the number of strings and the number of

columns specifies the maximum length of each string.

For example:

```cpp
   char str_array[30][80];
   char day[7][10] = { "Sunday" , "Monday",
                       "Tuesday" , "Wednesday",
                       "Thursday", "Friday",
                       "Saturday" };
```

To access an individual string, we simply specify only the row index.

For example:

```
cout << day[1];
```

Example: Use array of string to write a C++ program that prints the week days.

```cpp
#include <iostream>
using namespace std;
int main()
{
  char day[7][10] = { "Sunday" , "Monday",
                      "Tuesday" , "Wednesday",
                      "Thursday", "Friday",
                      "Saturday" };
  for(int i=0 ; i<7  ; i++)
    cout<<day[i]<<endl;
  return 0;
}
```

Example: Write a C++ program that input 5 names into array of strings. Then the program converts any small letter to capital in those names.

```cpp
#include <iostream>
using namespace std;
int main()
{
  char names[5][10];
  cout<<"Enter five names : ";
```

```
  for(int i=0 ; i<5    ; i++)
    cin >> names[i];
  for(int i=0 ; i<5    ; i++)
    for (int j=0 ; names[i][j] ; j++)
      if(names[i][j] >= 'a' && names[i][j] <= 'z')
        names[i][j] -= 32;
  cout <<"\nConverted names: " << endl ;
  for(int i=0 ; i<5    ; i++)
    cout<<names[i]<<endl;
  return 0;
}
```

Homework:

1. Write a C++ program that inputs 10 names (each has a maximum 10 letters) and count the number of the names that starts with letter "A".

2. Write a C++ program that inputs 5 names (each has a maximum 10 letters) and converts the first letter (if small) to the capital letter then prints those names.