Arrays (some stuff)

In general

`elemtype aname[alength];`

- Block of memory of length `S*alength` is allocated,
  `S` = size in bytes of a single `elemtype` variable.
- `aname` = starting address of zeroth element = address of allocated block.
- Value of `aname` cannot be changed.
- Type of `aname: elemtype *`
- Type of `aname[i] : elemtype`

Example

- What does the following code do?

```
int q[4];
int *r;
r = q;
r[3] = 5;
cout << q[3] << endl;
cout << r[3] << endl;
```

- The array `q` is allocated in memory.
- Variable `r` is created.
- `q` = address of the zeroth element of the array is placed in `r`.
- Because `r`, `q` have the same value, `r[3]`, `q[3]` also denote the same variable.

Character arrays with initialization

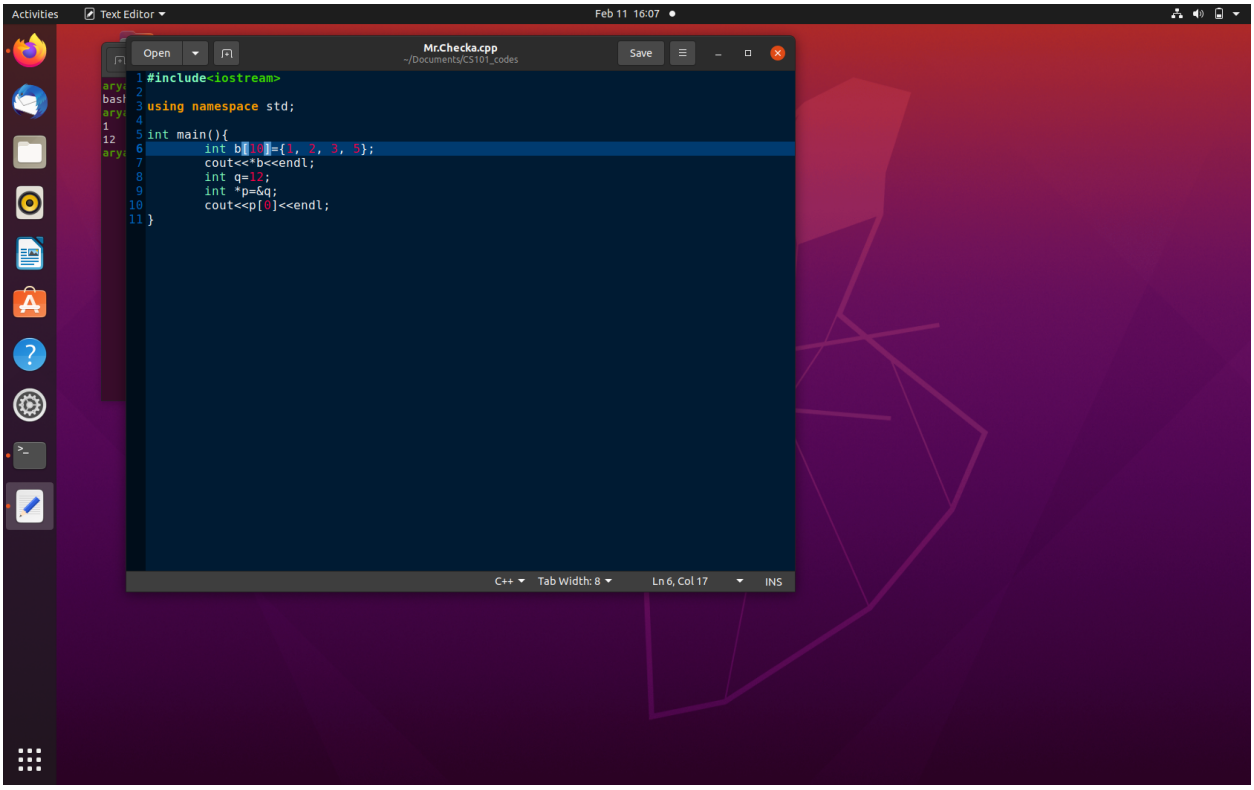
```
char n1[20]="Ajanta", n2[]="Ellora";
```

n1 will be created with length 20, and initialized as follows.

- 'A', 'j', 'a', 'n', 't', 'a' will get stored in `n1[0]` through `n1[5]`.
- Finally '\0' will get stored in `n1[6]`.
- The elements `n1[7]` through `n1[19]` will not be initialized.

n2 will be created of length 1 + the length of the string "Ellora".

- It will also be initialized to the string "Ellora" followed by '\0'.



Here you can clearly see 2 things-

1. You can denote *p by p[0] for any general pointer (Need not even be an array)
   BTW p[1] will give you the int that occupies the space just after *p or p[0] ends as computer will read p[n] as *(p+sizeof(datatype) $\times$ n)
2. int b[10]={1,2} is as valid as int b[]={1,2} but-
   int b[];
   isn't valid

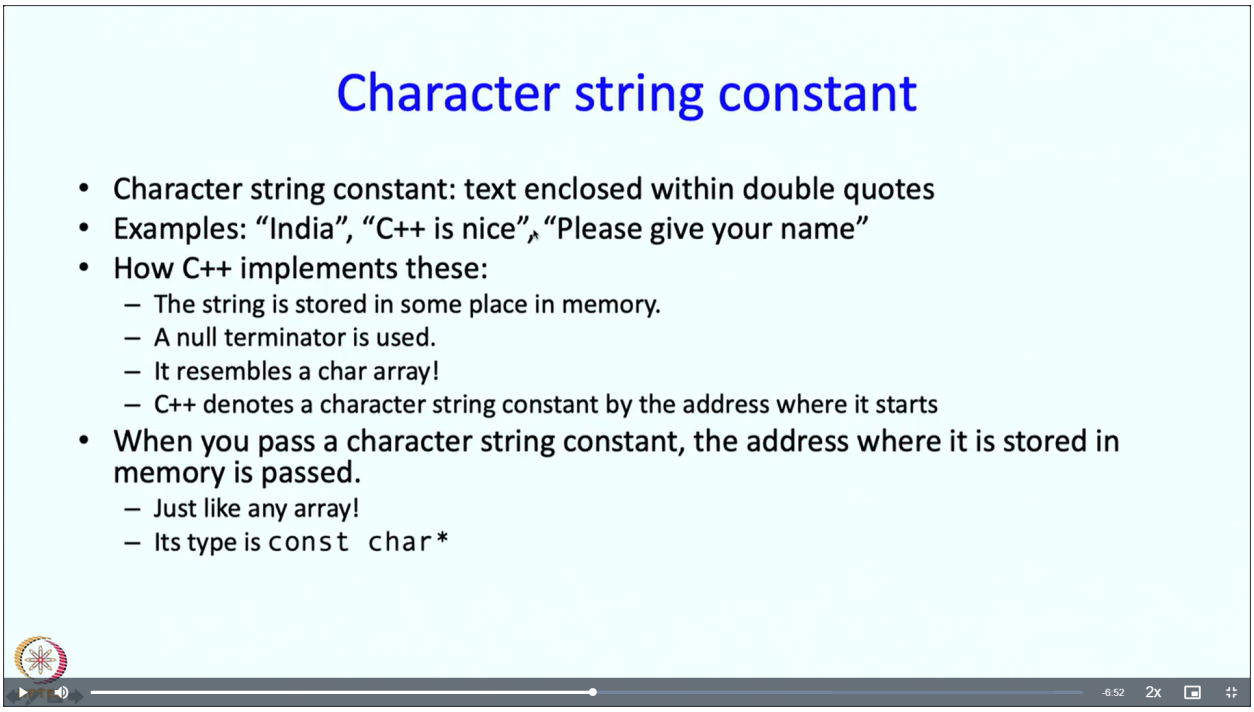
BTW the '\0' at the end of a string/ character array is called "sentinel"
Also cout<<char_array prints the string instead of the address as you would normally assume

Also also you can do

```
char arr[50]="Yes";
```

but you can't do

```
char arr[50]="Yes";
arr="No"; //Thus this means that you can only equate char_array to a string during Declaration
//But never otherwise i.e. aisehi assignment not allowed
```



While passing functions if use const char, then the string becomes const and we cannot change it at all-

```
void f(int arr[], char *muslin, const char nope){ //We could also have used char muslin[]
    muslin[0]='N';
    muslin[1]='o';
    muslin[2]='\0';
    //nope[0]='J' will give errors as we have defined the string as const
    return;
}

int main(){
    int arr[50]={1,2,3,4};
    char nope="Papaji";
    //btw char muslin[50]=nope is illegal
    char muslin[20]="Yes daadi";
    cout<<muslin<<endl;
    f(arr, muslin);
    cout<<muslin;
    return 0;
}
```

In 2D arrays (or multidimensional arrays in general, you have to hardcode all but one... woh re while passing. Like dekh le

```
//void death(int arr[][], char mamu[][][]) gives error
void death(int arr[][10], char mamu[][12][20]){
...
}
```

Compiler allots memory to 2D arrays row-wise i.e.

```
int arr[3][4];
```

This will be stored as arr[0][0], arr[0][1]...arr[0][3], arr[1][0]....arr[1][3].....arr[2][3]

1 / 1 points 1 / 1 attempts

Consider a two-dimensional array int pqr[5][5] and the element pqr[0][0] is stored at the address 0x52A12F0. What is the address of the element pqr[2][3] in the above arrangement? Consider int to be size 4 bytes.

- ○ 0x52A12F0
- ○ 0x52A1324
- ○ 0x52A1358
- ○ 0x52A138C

Submit

Hint

Answer

0x52A1324

You can hard-code initialise 2D arrays as such-

```
int arr[2][3]={{1,2,3},{4,5,6}}
//You can even write it as {1,2,3,4,5,6} as it dgaf
```

```
char countries[3][20] = {“India”, “Nepal”, “China”};
```

- Creates array `countries` with 3 rows each of 20 characters.
- 2d array = collection of 1d arrays.
- Thus `countries[i]` = array consisting of countries[i][0]...countries[i][19]
- Row i of array is initialized using ith character string in rhs.
- As usual, each character string implicitly includes a ‘\0’ following it.

```
//In above code if we did this-
cout<<countries[1];
//Output- Nepal
```