



```
operator[]
```

The index operator

THREE VARIABLE CHARACTERISTICS

counter 123 0x000000ab
i ii iii

- Variables have three characteristics
 - (I) Name
 - (II) Content
 - (III) Address
- Compiler maps the name to the address

```
int counter = 123;
```

```
counter = 5;  
balance = counter * 10;  
cout << counter << endl;
```

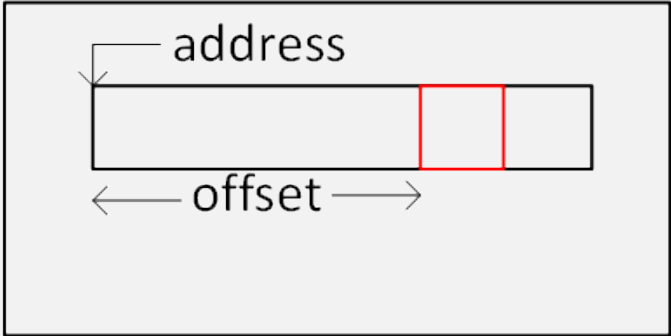
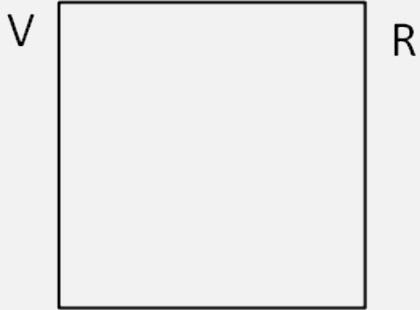


THE FUNDAMENTAL OR BUILT-IN INDEX OPERATOR

- `char message[100];`
- `char c = message[10];`
- `message[10] = 'X';`
- The square brackets have multiple meanings
 - Define arrays
 - Index into arrays
- Locate an array element by calculating an offset with address arithmetic
 - `array address + index × the element size`
 - `message + 10 * sizeof(char)`



C++ REFERENCES

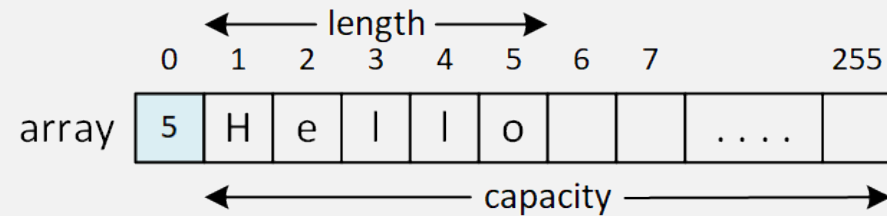


- Compiler maps a variable name to an address
- To create a reference, it maps a second variable name to the same address
 - Contents
 - Storage location
- $\text{offset} = \text{index} \times \text{element size}$
- $\text{element address} = \text{array address} + \text{offset}$

OVERLOADING operator []

```
class LPString
{
private:
    char array[255];
public:
    char& operator[](int index);
};

char& LPString::operator[](int index)
{
    if (index > 0 && index <= array[0])
        return array[index];
    else
        throw "Index out of bounds";
}
```



```
LPString message;
```

```
char x = message[5];
message[5] = 'A';
```