June 20, 2015

Launchpad

Lecture - 5

Programming Fundamentals - 4

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CODING BLOCKS

Status of Assignment?

Any doubts?

Warmup? (20 min)

What is the maximum number of squares of size 2x2 that can be fit in a right angled isosceles triangle of base B.

One side of the square must be parallel to the base of the isosceles triangle.

Base is the shortest side of the triangle

For e.g. :

1 – 0 , 2 – 0, 3 – 0 , 4 – 1, 5 – 1, 6 – 3, 7 – 3, 8 - 6

Other Language Constructs

I. do while
II. switch case
III. Tertiary operator (? :)

Time to talk about functions?

What is a function?

I. A function groups a number of program instructions into one unit and gives it a name. This can then be invoked from other parts of the program.
II. It adds conceptual organization and increases reusability of the code.

Lets move some of our programs to functions!

Call Stack?

Scope of Variables?

Call by value?

Passing Arrays into a function!

Pointers

What are pointers?

I. Pointers are one of the most powerful and confusing aspects of the C/C++ language.
II. A pointer is a variable that holds the address of another variable.
III. To declare a pointer, we use an asterisk between the data type and the variable name

```
int *pnPtr; // a pointer to an integer value
double *pdPtr; // a pointer to a double value

int* pnPtr2; // also valid syntax
int * pnPtr3; // also valid syntax
```

Address of Operator (&)

Since pointers only hold addresses, when we assign a value to a pointer, the value has to be an address. To get the address of a variable, we can use **the address-of operator (&)**

```
int p = 5;
int * q = &p; // assign address of p in q
```

Dereference Operator (*)

An interesting property of pointers is that they can be used to access the variable they point to directly. This is done by preceding the pointer name with the dereference operator (*). The operator itself can be read as "**value pointed to by**"

Therefore the value pointed by q in previous example can be accessed as

```
int r = *q;
```

Null Pointer

Sometimes it is useful to make our pointers point to nothing. This is called a null pointer. We assign a pointer a null value by setting it to address 0:

```
double *p = 0;
```

Lets see what's happening in the memory!

Address are also passed by value to a function!

Pointers and Arrays!

I. Pointers and arrays are intricately linked in the C language
II. An Array is actually a pointer that points to the first element of the array! Because the array variable is a pointer, you can dereference it, which returns array element 0:
III. a[i] is same as *(a + i)

So when you pass an array to a function, you are basically passing address of the first element!

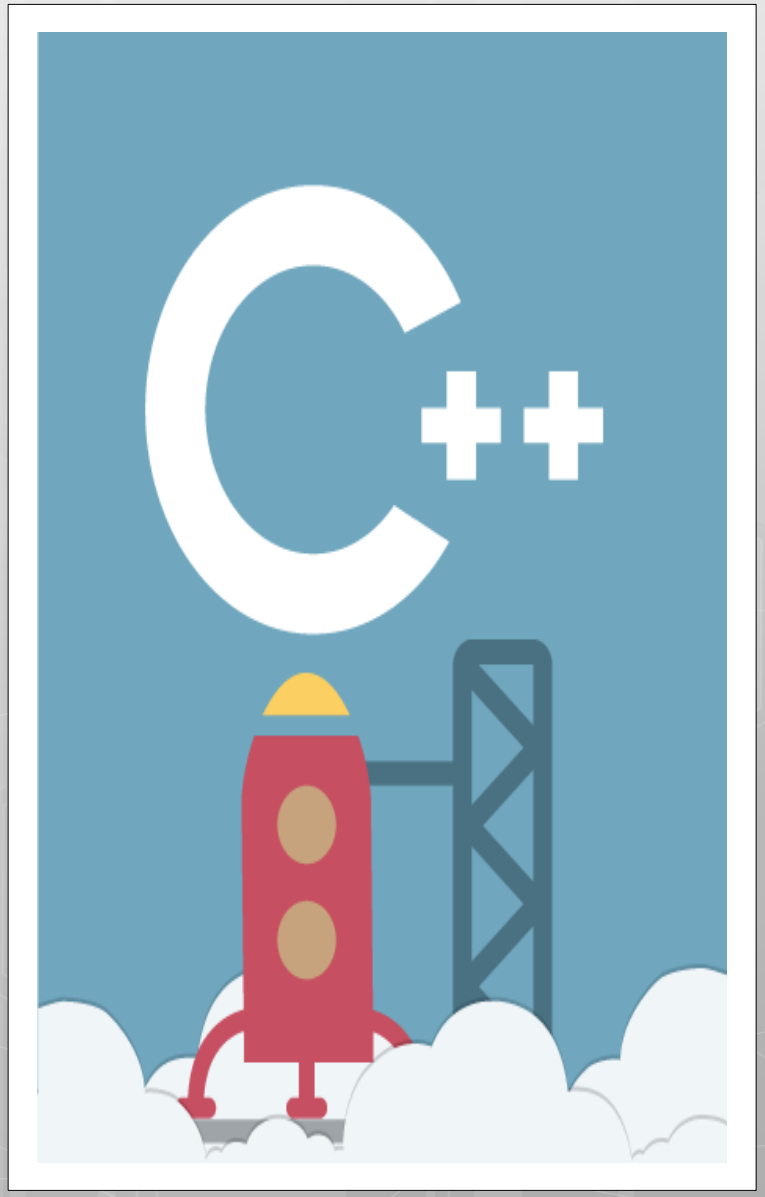
Binary Search?

Lets do some more problems?

I. Write a function to implement selection sort
II. Write a function which takes a sorted array, its length and a number X and returns the index of the X in that array. It returns -1 if not found. [Binary Search]

What is next class about?

I. Arrays contd…



Thank You!

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