June 22, 2015

Launchpad
Lecture – 6

Programming Fundamentals - 4

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Any doubts?

Multi Dimensional Arrays

Lets write some code

- Lets take input from the user
- Lets print it
- Find a number in a 2D array.

Time to try!

- Find the largest element in 2D array
- Write a program that determines which row or column in a 2d array of integers has the largest sum.
- Wave Print

Pointers!

What are pointers?

- Pointers are one of the most powerful and confusing aspects of the C/C++ language.
- A pointer is a variable that holds the address of another variable.
- 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;
```

Arrays and Pointers

Arithmetic Operators & Pointers

- Pointer increment/Addition
- Pointer Decrement/ Subtraction
- Pointer comparison

Arrays and Pointers

- Pointers and arrays are intricately linked in the C language
- 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:
- a[i] is same as *(a + i)
- Its possible to pass part of an array to function.

Recursion

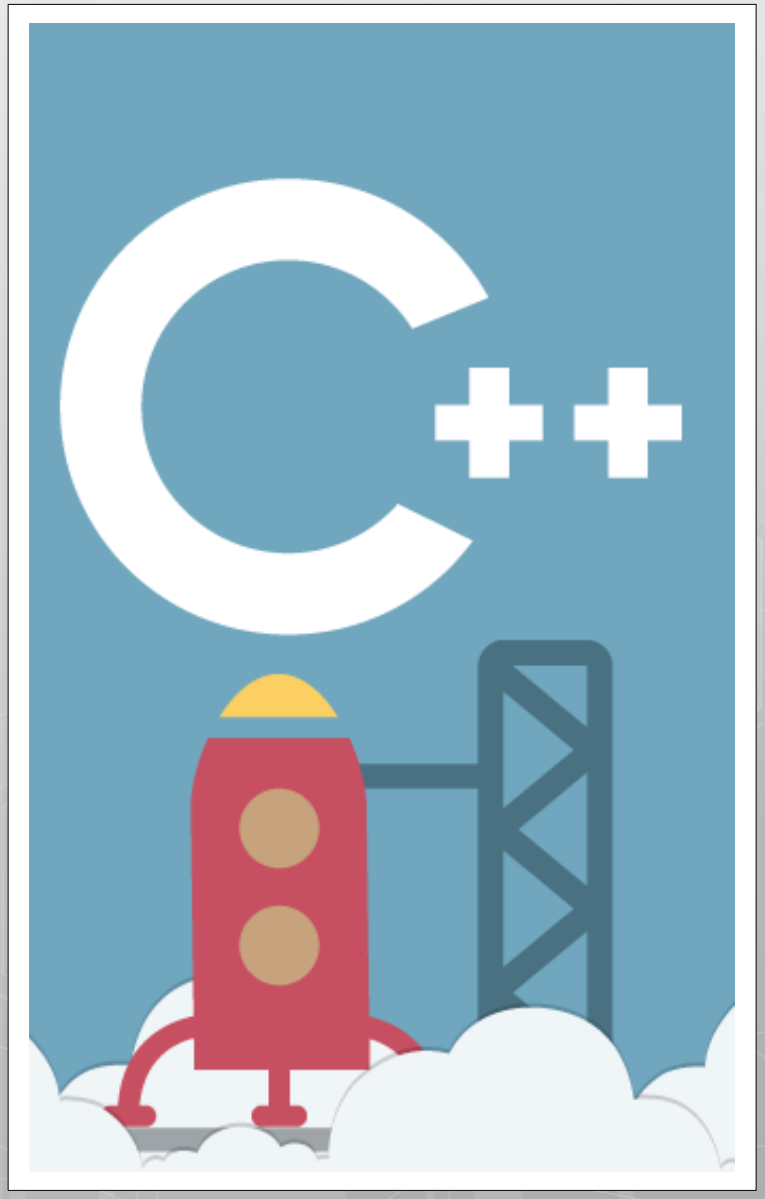
Recursion in computer science is a method where the solution to a problem depends on solutions to smaller instances of the same problem.

Lets write some code

- Factorial
- Fibonacci
- Check if an array is sorted

Your Turn

- Write code for a function power(x,n) which evaluates x^n.
- Given an array check if it contains 7



Thank You!

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