Lecture 32 — Library Functions

J. Zarnett
jzarnett@uwaterloo.ca

Department of Electrical and Computer Engineering
University of Waterloo

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The system provides a number of classes and types (in various namespaces, like `std`) for programmers' use.

We often ask students, as exercises, to implement functions like absolute value or exponentiation.

In practical situations, these functions are already available to us as static methods of specific classes.

Many of the built-in classes are in the `std` namespace.

A number of different mathematical operations:

NAME	DESCRIPTION	TYPE OF ARGUMENTS	TYPE OF VALUE RETURNED	EXAMPLE	VALUE	LIBRARY HEADER
sqrt	Square root	double	double	sqrt(4.0)	2.0	cmath
pow	Powers	double	double	pow(2.0,3.0)	8.0	cmath
abs	Absolute value for int	int	int	abs(-7) abs(7)	7 7	cstdlib
labs	Absolute value for long	long	long	labs(-70000) labs(70000)	70000 70000	cstdlib
fabs	Absolute value for double	double	double	fabs(-7.5) fabs(7.5)	7.5 7.5	cmath
ceil	Ceiling (round up)	double	double	ceil(3.2) ceil(3.9)	4.0 4.0	cmath
floor	Floor (round down)	double	double	floor(3.2) floor(3.9)	3.0 3.0	cmath
exit	End program	int	void	exit(1);	None	cstdlib
rand	Random number	None	int	rand( )	Varies	cstdlib
srand	Set seed for rand	unsigned int	void	srand(42);	None	cstdlib

Credit: *Absolute C++* by Walter Savitch.

To make use of a function like `sqrt`, we need to include the appropriate library header.

`#include<iostream>` has appeared frequently in our code.

This includes the functions of the `iostream` header.

Now, to use the square root function, use `#include<cmath>`.

Then we can simply use this function:
```
double root = sqrt( number );
```

The examples shown in the previous slides show library (system-provided) functions.

Although we may ask you to work with these methods or to implement them, it is rarely a good practice to "reinvent the wheel".

If you attempt to reinvent something that is already created, there is a good chance you will make some mistakes, even if they are obscure.
  For an interesting real-world example, see:
  `http://blog.codinghorror.com/whats-wrong-with-turkey/`

When a library function exists to do the operation you want to perform, make use of that library function.

Be sure, however, to check the documentation to learn how to call the function properly (e.g., order of parameters).