Math functions

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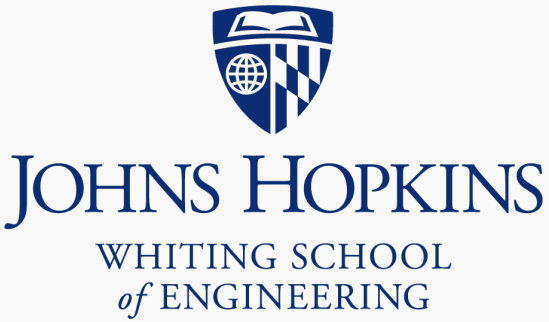

Source markdown available at github.com/BenLangmead/c-cpp-notes

Math functions

`#include math.h` **and** compile with `-lm` option to gain access to these basic mathematical functions:

- `sqrt(x)`: square root
- `pow(x, y)`: x^y
- `exp(x)`: e^x
- `log(x)`: natural log
- `log10(x)`: log base 10
- `ceil(x)` / `floor(x)`: round up / down to nearest integer
- `sin(x)`: sine (other trigonometric functions available)

Math functions

x and y arguments have type `double`

It's also OK to pass another numeric type, like `int`

- Argument type promotion: `int` -> `float` -> `double`

`-lm` includes the math library when *linking*

Math functions

```c
#include <stdio.h>
#include <math.h>

int main() {
    // a and b are the short side lengths for right triangle
    // Pythagorean theorem: a*a + b*b = c*c
    float a, b;
    scanf("%f%f", &a, &b);
    float c = sqrt(a*a + b*b);
    printf("Third side length = %0.3f\n", c);
    return 0;
}
```

```
$ gcc assert_eg.c -lm -std=c99 -pedantic -Wall -Wextra
$ echo 3.0 4.0 | ./a.out
Third side length = 5.000

$ echo 3.0 3.0 | ./a.out
Third side length = 4.243
```