CS 161
Intro to CS I

Functions: Pass by Reference, Overloading, and Default Args
Chap. 4.1-4.2
Odds and Ends...

• Assignment 3???
• Functions/Friday’s Lecture?
• Test moved to 10/26...
Conditionals, Functions, Program...

• What is the difference?
  
  break;
  return;
  exit(1);
Default Args

```cpp
#include <iostream>

using std::cout;
using std::endl;

int pwr(int, int n=1);  // Example of default args

int main() {
    int base=2, expn=8;

    cout << "The power function: " << pwr(base, expn) << endl;
    cout << "The power function: " << pwr(base) << endl;

    return 0;
}

int pwr(int x, int n) {
    int num=1;

    for(int i=0; i < n; i++) {
        num*=x;
    }

    return num;
}
```

"test.cpp" 25L, 388C written 1,19 All
C++ Function Overloading

• Multiple functions w/ same name
• Arguments determine function
• Default Args can be done w/ overloading
```cpp
#include <iostream>

using std::cout;
using std::endl;

int pwr(int, int n=1);  // Example of default args
double pwr(double, double);  // Example of overloading

int main() {
    int base=2, expn=8;
    double dbase=2.2, dexp=8.0;

    cout << "The power function: " << pwr(base, expn) << endl;
    cout << "The power function: " << pwr(dbase, dexp) << endl;

    return 0;
}

double pwr(double x, double n) {
    double num=1.0;

    for(int i=0; i < n; i++) {
        num*=x;
    }

    return num;
}
```

How do we change values?
Pass by Value vs. Pass by Reference

- Value Semantics
  - Values stored directly
  - Copy of value is passed
  ```
  int i, j=2;
i=j;
  ```

- Reference Semantics
  - References to the value are stored
  - Copy of address is passed
  ```
  int *i, j=2;
i=&j;
  ```
C/C++ Pass by Value

void swap(int, int);
int main() {
    int a=5, b=10;
    swap(a, b);
    printf("a: %d, b: %d\n", a, b);
}
void swap(int x, int y) {
    int temp = x;
    x = y;
    y = temp;
}
• What if we didn’t have temp?
void swap(int *, int *);
int main() {
    int a=5, b=10;
    swap(&a, &b);
    printf("a: %d, b: %d\n", a, b);
}

void swap(int *x, int *y) {
    int temp = *x;
    *x = *y;
    *y = temp;
}
C++ Pass by Reference

```cpp
void swap(int &, int &);
int main() {
    int a=5, b=10;
    swap(a, b);
    printf("a: %d, b: %d\n", a, b);
}
void swap(int &x, int &y) {
    int temp = x;
    x = y;
    y = temp;
}
```

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Quiz #4

• Get into groups of 4-5.
  – What material do you want to review on Wed?
  – Each person in your group come up with one question for the test.