CS 161
Intro to CS I
Looping/Repetition
Odds and Ends...

• Finish reading loops and begin functions
• Exercise #3 due tonight, 1/22
• Lab #3 make-up, KEC 1003 Friday, 1/22, 3-5pm
• Demo assignment #2 by 1/25
• Test next Friday, 1/29, during class time
do while vs. while

```cpp
#include <iostream>
#include <cstdlib>
#include <ctime>
using namespace std;
#define END_VAL 3

int main() {
    int rnum, unum;
    //bool error=true;
    //only do this once to make sure rand gives different
    //numbers each time you run the program
    srand(time(0));
    rnum = rand() % 11; //range 0-10
    cout << rnum << endl;

    //give the user 3 opportunities to enter guess right
    for (int x = 1; x <= END_VAL; x++) {
        cout << "Enter a number 0-10: ";
        cin >> s;
        //error=true; //assume they are idiots
        //check for errors until a good number is given
        /*do {
           if (unum < 0 || unum > 10) {
               cout << "you idiot! I said 0-10!" << endl;
               cout << "Enter a number 0-10: ";
               cin >> unum;
           } else
               error=false; //we now do not have an error
        }while (error==true);*/
    while (unum < 0 || unum > 10) {
        cout << "you idiot! I said 0-10!" << endl;
        cout << "Enter a number 0-10: ";
        cin >> unum;
    }
    cout << "user num: " << unum << endl;
    return 0;
}
```
The for Loop Examples

for(x=-100; x <= 100; x++)
    cout << "hello world\n";
for(x=2+2; x <= 17*3; x++)
    cout << "hello world\n";
for(x=0; x <= 100; x++)
    cout << "hello world\n";
for(x=0; x < 100; x++)
    cout << "hello world\n";
for(x=-100; x <= -1; x++)
    cout << "hello world\n";
The for Loop Examples

```cpp
for(x=1; x <= 1; x++) {
    cout << "hello world\n";
}
```

```cpp
for(x=1; x < 1; x++) {
    cout << "hello world\n";
}
```

• Why is it better to use curly braces?

1st statement / construct is associated with loop.
The for Loop Pattern

for(<variable> = n; <variable> <= p; <variable>++) {
    <statement>;
    ...
}

for(<variable> = n; <variable> >= p; <variable>--) {
    <statement>;
    ...
}
Nested for Loops

\[
N^2
\]

for(x = 0; x < 10; x++) {
    for(y = 0; y < 10; y++) {
        cout << "hello world\n";
    }
}

• How many times is Hello World printed?
Reuse Variables

for(x = 0; x < 10; x++) {
    cout << "The value of x is: " << x << endl;
}

for(x = 0; x < 10; x++) {
    cout << "The value of x is: " << x << endl;
}
Variables with same name

```cpp
int x;
for(x = 0; x < 10; x++) {
    for(x = 0; x < 10; x++) {
        cout << "The value of x is: " << x << endl;
    }
}
```

• What is the output from this nested loop?
Infinite Loops

```cpp
int x;
for(x = 0; x < 10; x++) {
    for(x = 0; x < 5; x++) {
        cout << "The value of x is: " << x << endl;
    }
}
```
Infinite Loops

```cpp
int x, y;
for(x = 0; x < 10; x++) {
    for(y = 0; y < 5; x++) {
        cout << "The value of x is: " << x << endl;
    }
}
```
Infinite Loops

```
int x, y;
for(x = 0; x < 10; x++) {
    for(y = 0; x < 5; y++) {
        cout << "The value of x is: " << x << endl;
    }
}
```
Infinite Loops

```cpp
int x;
for(x = 1; x <= 10; x++) {
    cout << "The value of x is: " << --x << endl;
}
```
How do we read a string of chars?

• User-defined type in string library
  
  `#include <string>`

• Declare/Create type
  
  `string mssg;`

• Read with cin or getline
  
  `cin >> mssg; //get a word`
  
  `getline(cin,mssg); //get a line of txt`
How would you make sure you get a good positive int?

Do not use cin.ignore() or cin.clear()
```cpp
#include <iostream>
#include <cstdlib>
#include <ctime>
#include <string> //c++ string
going namespace std;
#define GUESSES 3

int main() {
    int rnum, unum;
    string s;

    //only do this once and once only
    srand(time(NULL));
    rnum = rand() % 11; // in the range 0-10
    cout << rnum << endl;
    for (int x = 0; x < GUESSES; x++) {
        // error=true; // we assume they are an idiot first
        cout << "Enter a number 0-10: ";
        cin >> s;
        // if all the characters in the string are 0-9, then
        // it is a good positive int
        for (int i = 0; i < s.length(); i++) {
            if (!(s.at(i) >= '0' && s.at(i) <= '9')) {
                cout << "idiot! enter 0-10: ";
                cin >> s;
                i = -1;
            }
        }
        unum = atoi(s.c_str()); // change from string to int
        while (unum > 10 || unum < 0) {
            cout << "you idiot! enter 0-10! ";
            cin >> unum;
        }
        cout << unum << endl;
    }
    return 0;
}```