# CS161: Introduction to Computer Science I

## Week 5 – Review

11/2020

# What is in CS161 today?



- Review for Midterm
  - The difference between designing an algorithm and implementing C++ code.
  - Dealing with Data
  - Output Formatting
  - Conditional Expressions (if, else)
  - Operators Precedence
  - Loops (while, do while, for)
  - Sample Questions

# Review for Midterm



- The midterm is a closed book exam
- There will be questions asking you to determine the output of a program, indicate what is wrong with a program, evaluate conditional expressions, and write program fragments.

# Dealing with Data



- The basic data types:
  - Integer types: short, int, long, long long
  - Real number types: float, double
  - char type
  - bool type
  - Unsigned types
- The difference between dividing integers versus floating point numbers.
- What is variables? How to name a variable?

# Dealing with Data – Sample Quesitons



1. **What data type would you use to store**
   - your age
   - your gpa
   - your first name's initial
   - a test score (A, B, C)
2. **Which of the following are not legal integers:**

-32.0 +256 256 3,240 32000

# Dealing with Data – Sample Quesitons



3. **Why does C++ have more than 1 integer type?**
4. **Declare variables matching the following descriptions:**
   a) A short integer with value 80
   b) An unsigned int integer with value 42,110
   c) An integer with value 3,000,000,000
5. **How could you use C++ to find out which character the code 88 represents?**

# Output Formatting



- What is a C++ statement?
- How do you read information from the keyboard?
- How do you write information to the screen?
- Where should we include comments?
- Explain why it is important to prompt.
- Write a `cout` statement to display your name.

# Control structures



- The `if/else` control structures.
- The difference between relational operators, equality operators, and logical operators.
- The `while`, `do-while`, `for` loops

# if/else – Sample Question



1. Write a small program to read in two integer values and then display them in numerical order, regardless of the order in which they are

```
int main() {
   int first, second;
   cout << "Enter 2 whole numbers: ";
   cin >> first >> second;
   if (first <= second)
      cout << first << " " << second << endl;
   else
      cout << second << " " << first << endl;
   return 0;
}
```

# Control structures: Loop



- What does a loop allow us to do?
- Where do we put loops in our program?
- Why would you use a while loop rather than a do-while loop?

# Loop – Sample Questions



1. **Write C++ code to display each upper case letter of the alphabet**

# Sample Questions



- The following is supposed to output all **positive odd numbers less than 10**.
- It contains some errors.
- What are they and how can they be corrected?

```
int x = 1;
while (x != 10) {
    x += 2;
    cout << x << endl;
}
```

# Sample Questions



- Write a for loop to output all positive odd numbers less than 10, starting at 1

```
int i;  //loop control variable
for (i = 1; i < 10; i = i + 2)
    cout << i << endl;
```

# Sample Questions



- What is the output of the following program fragment?

```
int i;   //loop control variable
for (i = -1; i <= 5; i = i + 1)
    cout << 2*i;
cout << endl;
```

- How would you fix the appearance of the output?

```
        cout << 2*i << '\n';
Or,     cout << setw(5) << 2*i;
```

# Sample Questions:



- Change the following while loop to a do-while loop:

```
int i;
cin >> i;
while (i < 20) {
   cout << i << ' ';
   i += 5;
}
```

Answer

# Sample Questions:



- What will be the output for the following:

```
int k,j; //loop control variable
for (k = 2; k <= 4; k = k + 1)
{
    for (j = 5; j <= 8; j = j + 1)
        cout << k+j;
    cout << endl;
}
```

# Exercises



1. Given a positive integer number n (with n>=2), you are asked to write a program to check if n is a prime number or not. Print the result to the screen.
2. Given N, print out ALL of the prime numbers from 2 to N.
3. Using loop to find out the least common multiple of two integers M and N

# Exercises



4. Using loop to print out multiplication table
5. Calculate sum of numbers

   S= 1/(1*2) +1/(2*3) +…+ 1/(n*(n+1))
6. Read a number < 1000 in Vietnamese
   - Example: 956: chin tram nam muoi sau
7. Calculate the value of Fibonacci number at n
   - F(0) = 0; F(1) = 1
   - F(n) = F(n-1) + F(n-2)
8. Print all divisors of a given number n
9. Print all non-prime numbers lower than n

# Exercises