CS161
Intro to Computer Science I
Objects Review & Cumulative Algorithms
Chap. 4.2

Exam I

- Grades are posted
- I’ll return and review on Wed.
- Distribution
  3 - > 100
  16 – A
  10 – B
  12 – C
  9 – D
  8 – F
  Mean – 75, Median - 78

Class vs. Objects

- Class – category/type of object
- Object – entity containing state and behavior
  – Data/Attributes
  – Methods

- Variables vs. Objects?
Revisit Objects...

Scanner input; //create placeholder
...
input = new Scanner(System.in); //construct object
String txt = input.next().toUpperCase();

• Pros / Cons to this?

Random Numbers...

Math.random() vs. Random Class

• Generate 1 – 10
  (int) (Math.random() * 10) + 1

• Generate 1 – 10
  Random r = new Random();
  r.nextInt(10) + 1;

Repetitive Algorithms

• Sentinel Loops
  – Special value signals end of input

• Ex. Sum integers until -1 read
  int num, sum=0;
  Scanner input = new Scanner(System.in);
  System.out.println("Enter a number: ");
  while ((num=input.nextInt()) != -1) {
    sum+=num;
    System.out.println("Enter a number: ");
  }
Why can’t we?

• Ex. Sum integers until -1 read
  int num, sum=0;
  Scanner input = new Scanner(System.in);
  do {
    System.out.println("Enter a number: ");
    num=input.nextInt();
    sum+=num;
  } while (num != -1)

Cumulative Algorithms

• Operation in which overall value computed incrementally
• Ex. Summation!!!
  int sum=0;
  int n;
  Scanner input = new Scanner(System.in);
  n = input.nextInt();
  for (int x = 1; x <= n; x++)
    sum+=x*x;
  System.out.println("The sum is: " + sum);

Cumulative Algorithms cont...

• Ex. Counting Characters
  int sum=0;
  char n='c';
  Scanner input = new Scanner(System.in);
  String sentence = input.nextLine();
  for (int x = 0; x < sentence.length(); x++)
    if(sentence.charAt(x) == n)
      sum++;           
  System.out.println("The character " + n + " was found " + sum + " times");
Cumulative Algorithms cont...

- Ex. Counting Multiple Characters
  ```java
  int sum=0;
  char n='c', n2='t';
  Scanner input = new Scanner(System.in);
  String sentence = input.nextLine();
  for (int x = 0; x < sentence.length(); x++)
    if ((sentence.charAt(x) == n || sentence.charAt(x) == n2))
      sum++;
  System.out.println("The characters " + n + " or " + n2 + " were found " + sum + " times");
  ```

Overloading Methods

```java
import java.io.*;
public class MultChars {
  public static void main(String[] args) {
    int sum;
    char n='c', n2='t';
    Scanner input = new Scanner(System.in);
    String sentence = input.nextLine();
    sum = countChars(sentence, n, n2);
    System.out.println("The characters " + n + " or " + n2 + " were found " + sum + " times");
  }

  public static int countChars(String sentence, char c1) {
    int sum = 0;
    for (int x = 0; x < sentence.length(); x++)
      if (sentence.charAt(x) == c1)
        sum++;
    return sum;
  }

  public static int countChars(String sentence, char c1, char c2) {
    int sum = 0;
    for (int x = 0; x < sentence.length(); x++)
      if (sentence.charAt(x) == c1 || sentence.charAt(x) == c2)
        sum++;
    return sum;
  }
}
```

User Errors

- Can we get an error when reading a String?
- Can we get an error when reading int, double, boolean?
- What can we do to prevent these errors?
  - Look ahead
  - try...catch