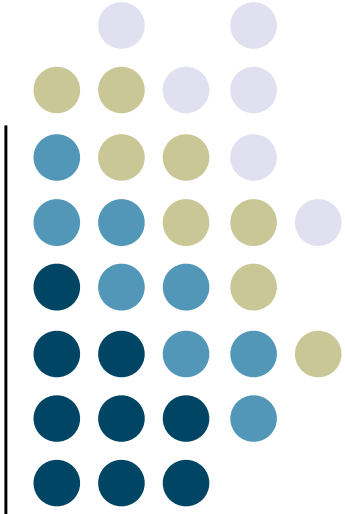
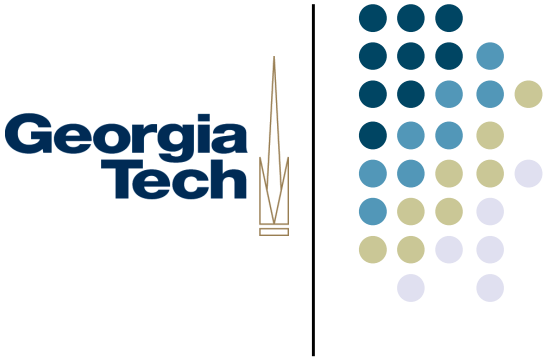
Intro to Java 2

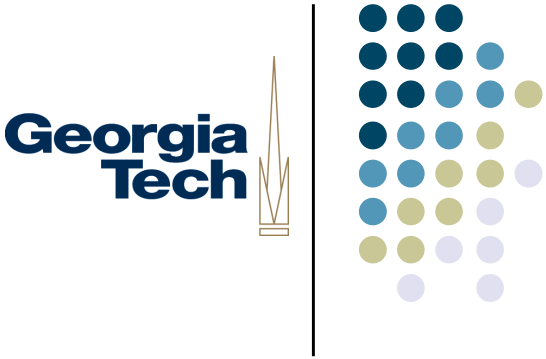


Learning Objectives



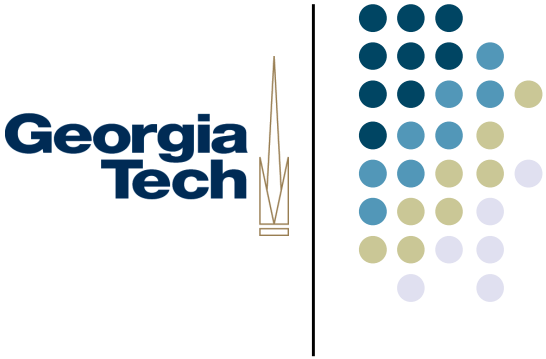
- Control flow
  - Conditionals
  - Iteration
- Random numbers
- Arrays
- Java API

Some Leftovers



```
i++;   // Similar to i = i + 1;

i += 12;    // Same as i = i + 12;
```

Some Leftovers



Block statement

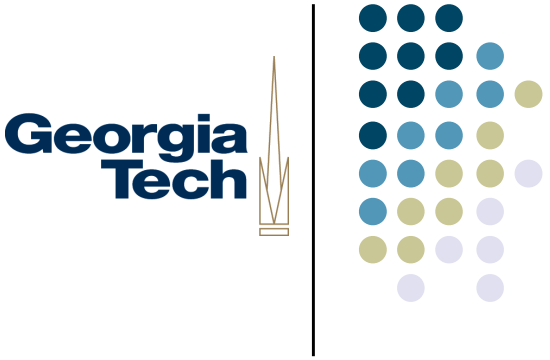
```
{
    // Statements here
}
```

can go anywhere a single statement can go

Control Flow

- How execution flows through a program
  - Conditionals
  - Iteration

Conditionals



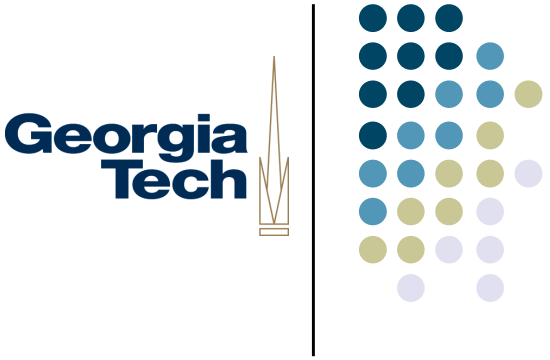
```
if (total > 20)
   sum = sum + total;

if (choice == x1) {
   value = value * 10;
   j = k / i;
}

if (!done && (total < 100))
   choice = scan.nextLine();
```

! – not

&& - and

|| - or

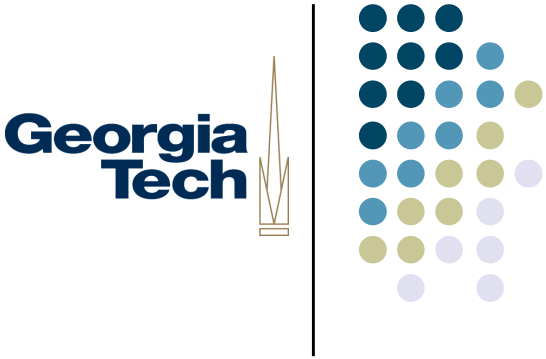
Conditionals



```
if (total < 20)
    sum = sum + total;
else if (total < 50) {
    sum = sum + 100;
    total = 0;
}
else if (total < 100)
    sum = 1000;
else {
    a = 1;
    b = 2;
}
```

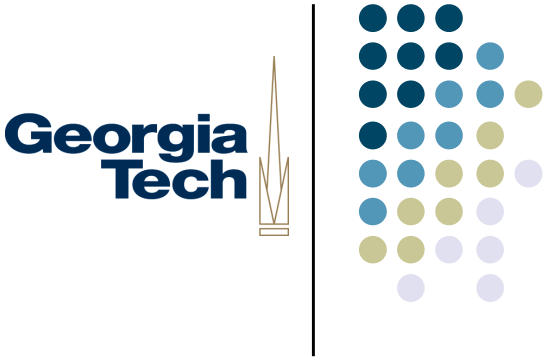
Multiple conditions

Iteration



- Multiple constructs
  - while
  - do
  - for

while



```
while (count < total) {
    sum = sum + count;
    count = count + 1;
}
```

Condition checked first
Body might never be done

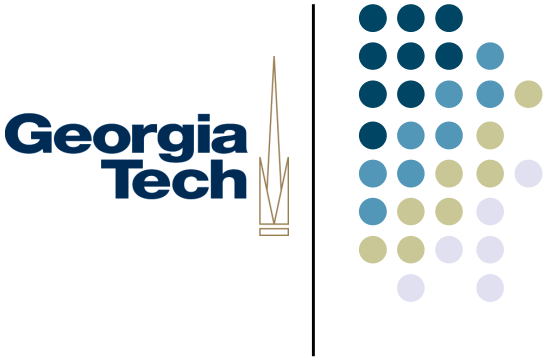
`continue` – jump back up to check condition
`break` – exit the loop and move to next statement

Find the Average

```
public static void main(String[] args) {
    Scanner scan = new Scanner(System.in);
    int i, count=0, sum=0;
    System.out.println("Enter numbers, -1 to quit");


    while (true) {
        i = scan.nextInt();
        if (i == -1)
            break;
        else {
            sum = sum + i;
            count++;
        }
     }
     System.out.println("Ave is "+sum/(double)count);

    }
```

Not the best code

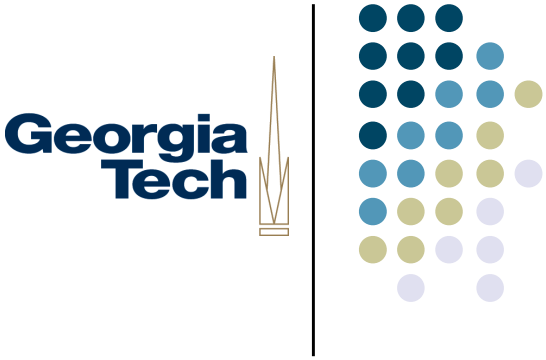
do



```
do {
    i = scan.nextInt();
    System.out.println(i);
} while (i != 0);
```

Body done at least once

for



```
for (int i=0; i<max; i++) {
  j = j + 1;
  System.out.println(i);
}
```

Body might never be done

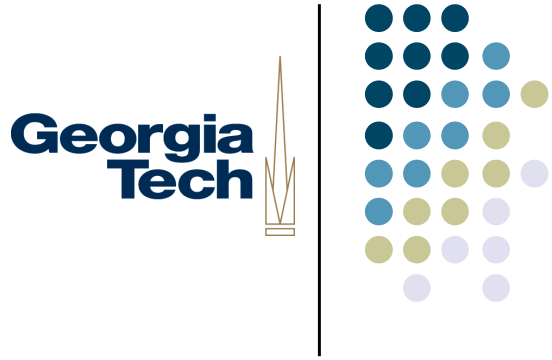
Equivalent to

```
i = 0;
while (i < max) {
   j = j + 1;
   System.out.println(i);
   i = i + 1;
}
```

When to Use

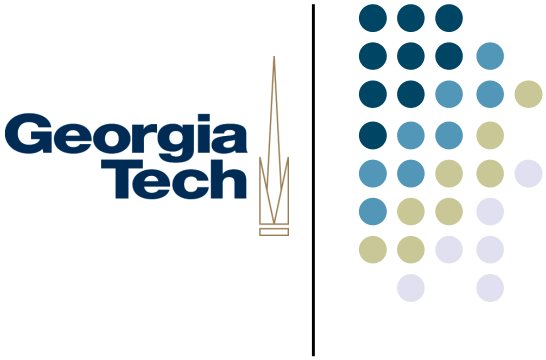
- Use `for` when your bounds are known
- Use `while` when unsure bounds
  - Maybe done never
- Use `do` when unsure bounds
  - Always done once

Palindromes



```
public static void main (String[] args)
  {
     String str, another = "y";
     int left, right;

     Scanner scan = new Scanner (System.in);
     while (another.equalsIgnoreCase("y")) // allows y or Y
     {
        System.out.println ("Enter a potential palindrome:");
        str = scan.nextLine();

        left = 0;
        right = str.length() - 1;

        while (str.charAt(left) == str.charAt(right) && left < right)
        {
           left++;
           right--;
        }
        System.out.println();

        if (left < right)
           System.out.println ("That string is NOT a palindrome.");
        else
           System.out.println ("That string IS a palindrome.");

        System.out.println();
        System.out.print ("Test another palindrome (y/n)? ");
        another = scan.nextLine();
     }
  }
```

Random Numbers



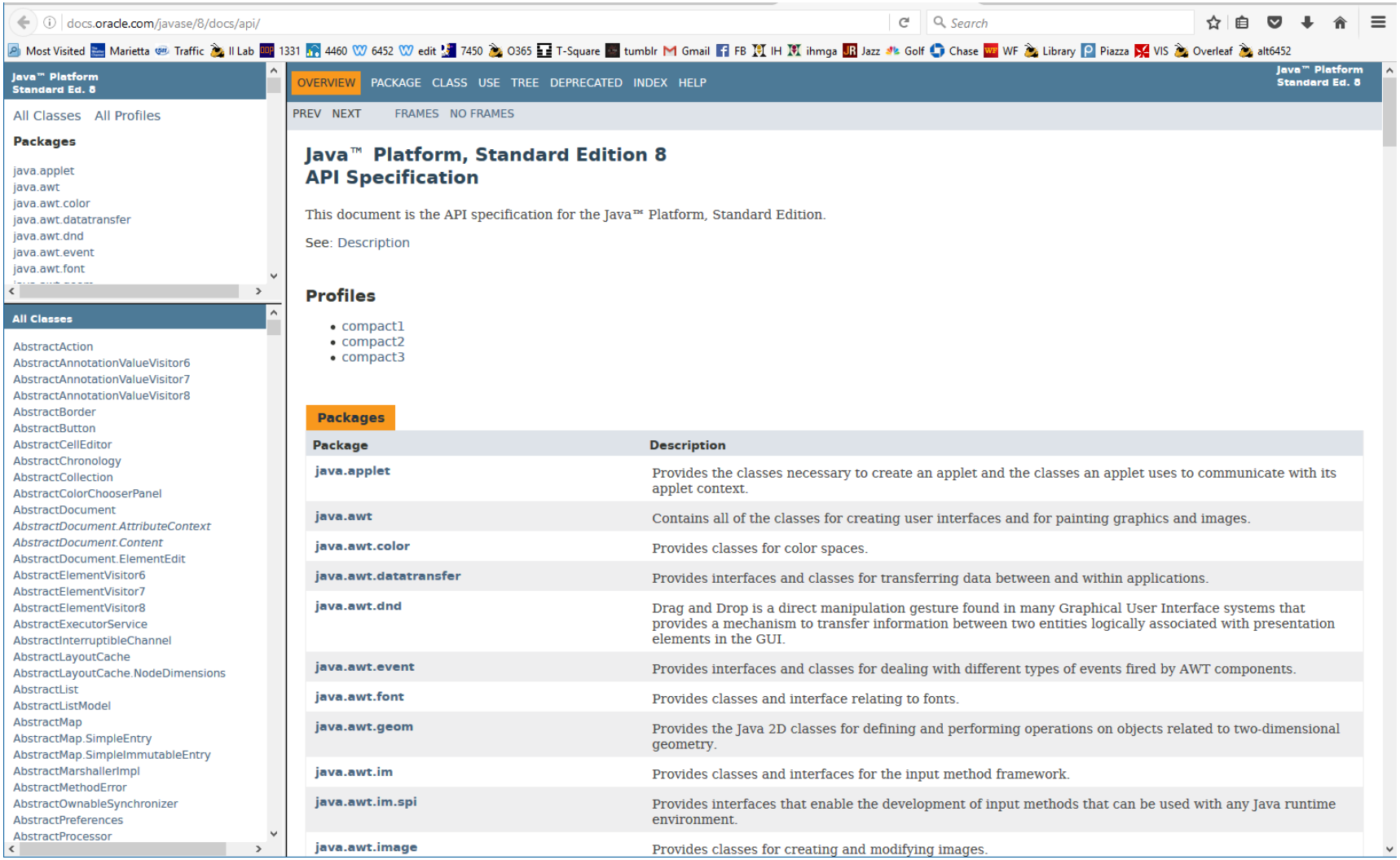
```
import java.util.Random;

int i;

Random gen = new Random();
i = gen.nextInt();
```

Calls

```
float nextFloat()
   // 0.0 <= x < 1.0
int nextInt()
   // all +,-,0
int nextInt(int num)
   // 0 <= x < num
```

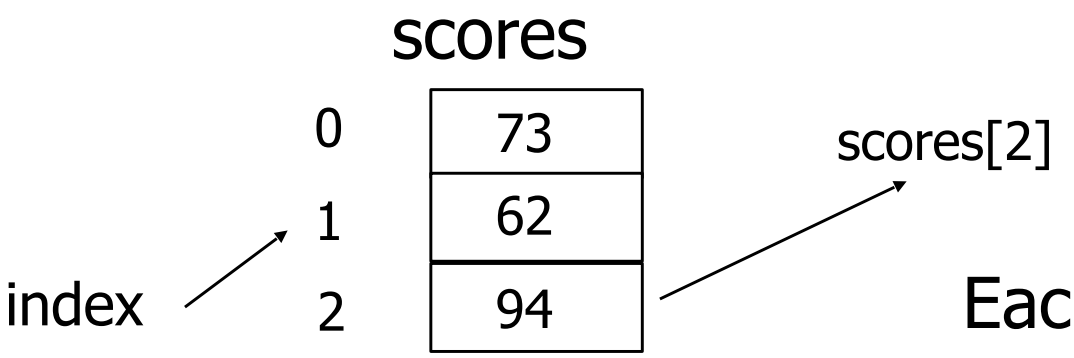
http://docs.oracle.com/javase/8/docs/api/

Java API



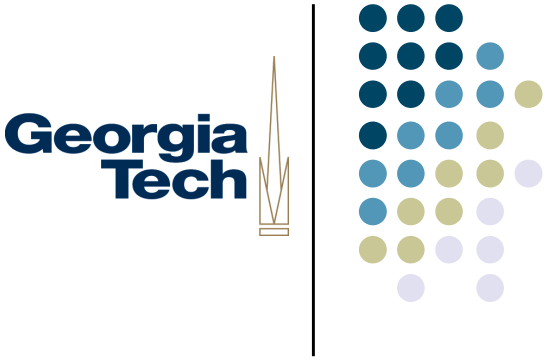
Arrays

- Lists of values
- Positions (index) are numbered
- Homogeneous type
- Uses [ ] notation



Each of these spots can be used anywhere an integer can

Arrays



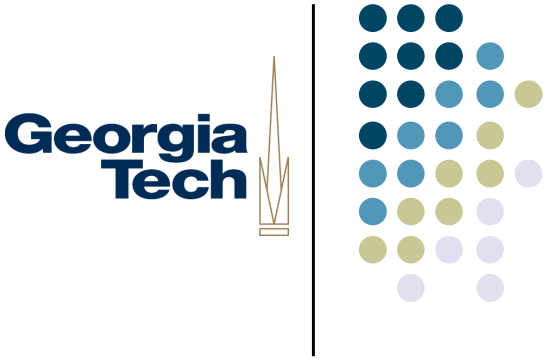
- Array is an object
  - Implications?

- Declaration

```
int[] scores = new int[3];
```

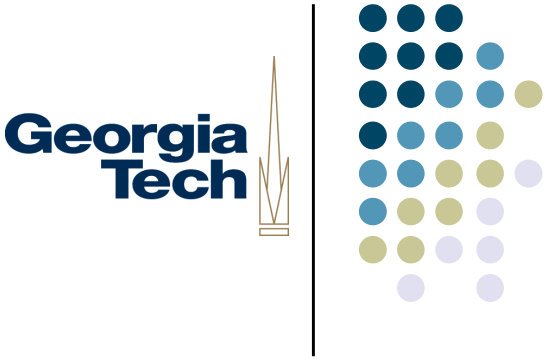
```
for (i=0; i<length; i++)
   exam[i] = i * 10;
```

Counting Letters



```
import java.util.Scanner;

public class LetterCount
{
   public static void main (String[] args)
   {
      final int NUMCHARS = 26;

      Scanner scan = new Scanner (System.in);

      int[] upper = new int[NUMCHARS];
      int[] lower = new int[NUMCHARS];

      char current;   // the current character
                      //   being processed
      int other = 0;  // counter for
                      //   non-alphabetics

      System.out.println ("Enter a sentence:");
      String line = scan.nextLine();

//  Count the number of each letter occurrence
      for (int ch = 0; ch < line.length(); ch++)
      {
         current = line.charAt(ch);
         if (current >= 'A' && current <= 'Z')
            upper[current-'A']++;
         else
            if (current >= 'a' && current <= 'z')
               lower[current-'a']++;
            else
               other++;
      }

      //  Print the results
      System.out.println ();
      for (int letter=0; letter < upper.length; letter++)
      {
         System.out.print ( (char) (letter + 'A') );
         System.out.print (": " + upper[letter]);
         System.out.print ("\t\t" + (char) (letter + 'a') );
         System.out.println (": " + lower[letter]);
      }

      System.out.println ();
      System.out.println ("Non-alphabetic characters: " +
                          other);
   }
}
```

Learning Objectives



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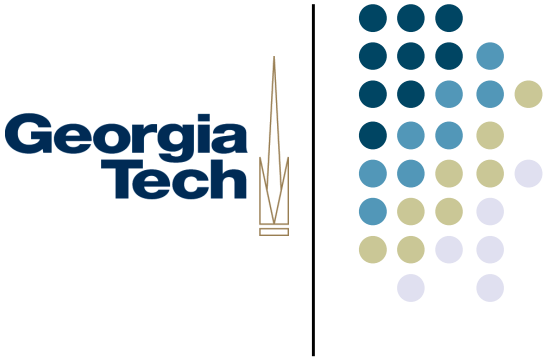
Next Time



- Classes and objects
  - Instance data
  - Methods
  - Visibility
  - Inheritance