CS 1323-020: Introduction to Computer Programming
Exam 3
November 17, 2014

General instructions:

- Please wait to open this exam booklet until you are told to do so.
- This examination booklet has 11 pages. You also have been issued a bubble sheet.
- Write your name, university ID number and date, and sign your name below. Also, write your name and ID number on your bubble sheet, and fill in the bubbles for your ID.
- The exam is open book and open notes, but is closed electronic device. The only exception is that you may use an electronic device to display a PDF copy of the book (all communication must be turned off and no other applications may be used).
- The exam is worth a total of 100 points (and 10% of your final grade). B-C-A-C-C
- You have 1.25 hours to complete the exam. Be a smart test taker: if you get stuck on one problem go on to the next.
- Use your bubble sheet to answer all multiple-choice questions. Make sure that the question number and the bubble row number match when you are answering each question. Use the provided space in this exam booklet to answer the coding questions.

On my honor, I affirm that I have neither given nor received inappropriate aid in the completion of this exam.

Signature: ______________________________

Name: ______________________________

ID Number: ______________________________

Date: ______________________________

Question	Points	Score
Arrays	32	
Nested Loops	20	
Searching and Sorting	20	
Coding	28	
Total:	100	

Part I. Arrays

1. (4 points) What is printed by the following block of code?

```java
int[] list = {5, 6, 8, 2, 3, 15};

System.out.println(list.length - 1);
```

A. 3   B. 5   C. 6   D. 15   E. Answer not shown

2. (4 points) What is printed by this program?

```java
public static String[] foo(String[] list)
{
  list[1] = list[2];
  return list;
}

public static void main(String[] args)
{
  String[] names = new String[3];

  names[1] = "Pansy";
  names[2] = "Peony";
  names[0] = "Polo";

  String[] list = foo(names);

  System.out.println(names[1]);
}
```

A. Pansy   B. Peony   C. Polo   D. Answer not shown   E. There is an error

3. (4 points) What is printed by this block of code?

```java
String[] invitations = new String[5];

invitations[1] = "Largo";
invitations[2] = "Laura";
invitations[3] = "Longo";
invitations[4] = "Lotho";

String out = "";

for(int i = 2; i >= 0; i -= 2)
{
  out += invitations[i];
}

System.out.println(out);
```

A. Laura   B. Longo   C. LongoLaura   D. LongoLargo
E. Answer not shown

4. (4 points) What is printed by this block of code?

```
int[] nums = {4, 2, 3, 5, 1};
int sum = 0;

for(int i = 0; i <= num.length; ++i)
{
  sum += nums[i];
}

System.out.println(sum);
```

A. 11 B. 14 C. 15 D. Answer not shown E. There is an error

5. (4 points) What is printed by the following block of code?

```
String[] names = {"Balbo", "Belba", "Belladonna", "Bingo", "Bungo"};

for(int i = names.length -1; i >= 0; i -= 1) {
  String name = names[i];

  if(name.charAt(name.length() - 1) == 'a') {
    System.out.println(name);
    break;
  }
}
```

A. Belba B. Belladonna C. Bingo D. Bungo E. Answer not shown

6. (4 points) What is printed by this block of code?

```
int[] list1 = {5, 3, 7};
int[] list2 = {4, 8, 3};

for(int i = 0; i < list1.length; ++i)
{
  if(list1[i] > list2[i])
  {
    int val = list1[i];
    list1[i] = list2[i];
    list2[i] = val;
  }
}

System.out.println(list2[1] + list2[2]);
```

A. 11 B. 12 C. 15 D. Answer not shown E. There is an error

7. (4 points) What is printed by the following block of code?

```java
int[] numbers = {4, 0, 2, 3, 1};

System.out.println(numbers[numbers[4]]);
```

A. 0 B. 1 C. 2 D. 3 E. Answer not shown

8. (4 points) What is printed by the following block of code?

```java
int[] numbers = {1, 16, 9, 4, 25};

System.out.println(numbers[numbers.length - 2]);
```

A. 1 B. 4 C. 9 D. 16 E. Answer not shown

Part II. Nested Loops

9. (4 points) What result is printed by this code block?

```java
int[] things = {3, 1, 2};
int bar = 0;

for(int i = 0; i < length.things; ++i)
{
  for(int j = i+1; j < length.things; ++j)
  {
    bar += things[j];
  }
}
System.out.println(bar);
```

A. 2 B. 5 C. 11 D. Answer not shown E. There is an error

10. (4 points) What is printed by this block of code?

```java
int[] elems = {3, 1, 2, 4, 5};
int[] agg = int[3];

for(int i = 0; i < agg.length; ++i)
{
  agg[i] = 0;
  for(int j = 0; j < 3; ++j)
  {
    agg[i] += elems[i+j];
  }
}

System.out.println(agg[2]);
```

A. 5 B. 7 C. 9 D. 11 E. Answer not shown

11. (4 points) What is printed by this block of code?

```java
int[] numbers = {3, 7, 5, 2, 1, 3, 5};

for(int i = 1; i < numbers.length; i += 2)
{
  for(int j = 0; j < numbers.length; j += 2)
  {
    if(numbers[i] == numbers[j])
    {
      System.out.println(i);
      return();
    }
  }
}
```

A. 0 B. 2 C. 5 D. 6 E. Answer not shown

12. (4 points) What is printed by this block of code?

```java
int[] numbers = {31, 37, 41, 43};
int k = 0;

for(int i = 0; i < numbers.length; i++)
{
  for(int j = i; j < numbers.length; ++j)
  {
    ++k;
  }
}

System.out.println(k);
```

A. 6 B. 10 C. 15 D. 16 E. Answer not shown

13. (4 points) What is printed by this block of code?

```java
int[] numbers = {19, 23, 29};
int k = 0;

for(int i = 0; i < numbers.length; i++)
{
  for(int j = 0; j < numbers.length; ++j)
  {
    ++k;
  }
}

System.out.println(k);
```

A. 0 B. 3 C. 9 D. 16 E. Answer not shown

Part III. Searching and Sorting

14. (4 points) What result is printed by this code block?

```java
int[] things = {3, 8, 1, 1, 7};
int query = 7;

for(int i = 0; i < length.things; ++i)
{
  if(things[i] == query)
  {
    System.out.println(i);
    break;
  }
}
```

A. 0 B. 4 C. 5 D. Answer not shown E. There is an error

15. (4 points) What result is printed by this program?

```
public static int foo(int[] things, int a)
{
  int top = 0;
  int bottom = things.length;
  int k = 0;
  while(top != bottom)
  {
    int center = (top+bottom)/2;
    if(a == things[center])
    {
      return k;
    }else if(a > things[center])
    {
      top = center+1;
    }else
    {
      bottom = center;
    }
    ++k;
  }
  return k;
}

public static void main(String[] args)
{
  int a = 11;
  int[] b  = {5, 7, 11, 13, 17, 19, 23};
  System.out.println(foo(b, a));
}
```

A. 1 B. 2 C. 3 D. Answer not shown E. There is an error

16. (4 points) What result is printed by this program? Assume the same definition of **foo()** as above.

```
public static void main(String[] args)
{
  int a = 13;
  int[] b  = {5, 7, 11, 13, 17, 19, 23};
  System.out.println(foo(b, a));
}
```

A. 1 B. 2 C. 3 D. Answer not shown E. There is an error

17. (4 points) What result is printed by this program?

```
public static int baz(int[] list)
{
  for(int i = 0; i < list.length - 1; ++i)
  {
    if(list[i] > list[i+1])
    {
      return i;
    }
  }
  return -1;
}

public static void main(String args[])
{
  int[] nums = {2, 4, 7, 8};

  System.out.println(baz(nums));
}
```

A. -1 B. 0 C. 3 D. Answer not shown E. There is an error

18. (4 points) What result is printed by this program? Assume the same definition of the method **baz()** as above.

```
public static void main(String args[])
{
  int[] nums = {3, 4, 9, 8, 11};

  System.out.println(baz(nums));
}
```

A. -1 B. 1 C. 2 D. Answer not shown E. There is an error

Part IV. Coding

19. (14 points) Write a **method** that takes as input an array of doubles sorted in **descending order** and a new double, and returns a new array that contains all doubles and is sorted in descending order.

    Examples:

    - $(8, 4, 3), 7 \rightarrow (8, 7, 4, 3)$
    - $(9, 5, 3, 2), 10 \rightarrow (10, 9, 5, 3, 2)$
    - $(7, 3), 1 \rightarrow (7, 3, 1)$

20. (14 points) Write a **method** that takes as input an array of ints and returns **true** if the array contains two numbers whose values are consecutive.

Examples:

- $(3, 8, 4) \rightarrow$ true (3 and 4)
- $(7, 3, 0, 6, 11) \rightarrow$ true (6 and 7)
- $(8, 3, 17, 5, 1, 11, 13) \rightarrow$ false