CSE142 Midterm Exam Key
Winter 2020

1.

Expression	Value
`1 + 2 * 3 - 4 * (5 + 6) / 7 + 8 % 9`	9
`20 / 7 * 2.0 + 5.0 / 2 - (1 / 4)`	6.5
`3 * 4 + "3" + 9 * 5 + 6`	"123456"
`(3 * 5 < 1 + 2) || (6 != 5 && !(7 < 7))`	true
`1 + 1 * (1 - 1) + (1 + 1 + 1) % (1 + 1)`	2

2. The program produces the following output:

```
A knight and a rook beats a pawn
A queen and a pawn beats a queen
A rook and a bishop beats a knight
A king and a queen beats a king
```

3.

Method Call	Output Produced
`ifElseMystery(5, 20);`	7 5
`ifElseMystery(42, 42);`	43 41
`ifElseMystery(7, 1);`	10 8
`ifElseMystery(2, 0);`	3 -1
`ifElseMystery(0, 0);`	1 -1

4.

Method Call	Output Produced
`mystery(2, 3);`	3, 2, -1
`mystery(3, 5);`	5, 4, -1, -5
`mystery(4, 7);`	7, 6, -1, -7, -6

5.

	n == 0	n % 2 == 1	x == 0
Point A	sometimes	sometimes	always
Point B	never	sometimes	sometimes
Point C	never	always	never
Point D	always	never	sometimes

6. One possible solution:

```
public static int longWords(Scanner input, int numWords) {
   String longest = "";
   int totalChars = 0;
   for (int i = 0; i < numWords; i++) {
      System.out.println((numWords - i) + " more words...");
      System.out.print("Next word? ");
      String word = input.next();
      totalChars += word.length();
      if (word.length() > longest.length()) {
         longest = word;
      }
   }
   System.out.println("Longest word: " + longest);
   return totalChars;
}
```

7. Two possible solutions:

```
public static int sameFlip(Random r) {
   int numFlips = 0;

   int prev = -1;
   int curr = -2;
   while (curr != prev) {
      int flip = r.nextInt(2);
      if (flip == 0) {
         System.out.print("H");
      } else {
         System.out.print("T");
      }

      numFlips++;
      prev = curr;
      curr = flip;
   }
   System.out.println(" - Done!");

   return numFlips;
}
```

```
public static int sameFlip(Random r) {
   int heads = 0;
   int tails = 0;
   int numFlips = 0;
   while (heads < 2 && tails < 2) {
      int flip = r.nextInt(2);
      if (flip == 0) {
         System.out.print("H");
         heads++;
         tails = 0;
      } else {
         System.out.print("T");
         tails++;
         heads = 0;
      }
      numFlips++;
   }
   System.out.println(" - Done!");
   return numFlips;
}
```

8. One possible solution:

```
public static void calculate(Scanner console, int numOps) {
   int numPlus = 0;

   System.out.print("First number: ");
   int total = console.nextInt();

   for (int i = 0; i < numOps; i++) {
      System.out.print("Operation: ");
      String op = console.next();

      System.out.print("Next number: ");
      int next = console.nextInt();

      if (op.equals("+")) {
         total += next;
         numPlus++;
      } else if (op.equals("-")) {
         total -= next;
      }

      System.out.println("Total so far: " + total);
   }
   System.out.println("Finished with " + 100.0 * numPlus / numOps + "% pluses");
}
```

9. Two possible solutions:

```
public static int uniqueChars(String str) {
   if (str.length() == 0) {
      return 0;
   }
   int count = 1;
   for (int i = 1; i < str.length(); i++) {
      if (str.charAt(i-1) != str.charAt(i)) {
         count++;
      }
   }
   return count;
}
```

```
public static int uniqueChars(String str) {
   String seen = "";
   for (int i = 0; i < str.length(); i++) {
      String curr = str.substring(i, i + 1);
      if (!seen.contains(curr)) {
         seen += curr;
      }
   }
   return seen.length();
}
```