1. (10 Points) true or false?

a. Given the following variable definitions:
 	
`int total = 0;`
 	
`for ( int i = 1 ; i <= 5 ; i++ ) {`
`   total += i * 2;`
`}`
 	
`total has the value 28 at the end of the for loop`
	true
	
	or
	
	false

b. Given the following variable definitions:
 	
`String s = "Mississippi";`
`char c1 = s.charAt(5);`
`char c2 = s.charAt(6);`
 	
`boolean b = (c1 == c2);   // b evaluates to:`
	true
	
	or
	
	false

c. Given the following variable definition:
 	
`String userString = "Chicago Cubs, 2016 World Series Champions";`
 	
The following expression:
 	
`Character.isLetter(userString.charAt(7)); // evaluates to:`
	true
	
	or
	
	false

d. Given:
 	
`for ( int i = 0 ; i < 5 ; i++ ) {`
`    if ((i % 2) == 0) {`
`        continue;`
`    } else {`
`       System.out.println("i = " + i);`
`    }`
`}`
 	
The loop will print output for i = 1 & i = 3 only.
	true
	
	or
	
	false

e. Given the following array definition:
 	
`int[] arr = new int[10];`
 	
The following loop will loop 10 times:
 	
`for ( int i = 1 ; i <= arr.length ; i++ ) {`
`    arr[i] += 1;`
`}`
	true
	
	or
	
	false

2. (30 Points) Given three arrays (colors added for emphasis):

```
int[] studentIDs = {5534, 2238, 6598, 7922, 4973}; // array of student IDs
int[] numGrades = {4, 2, 3, 1, 2}; // array of number of grades for each student
int[] grades = {87, 92, 33, 65, 79, 92, 88, 95, 75, 99, 68, 72};// array of grades
```

Your program should produce the following output:

```
Student ID = 5534 Count = 4 Grades = 87 92 33 65
Student ID = 2238 Count = 2 Grades = 79 92
Student ID = 6598 Count = 3 Grades = 88 95 75
Student ID = 7922 Count = 1 Grades = 99
Student ID = 4973 Count = 2 Grades = 68 72
```

Solution:

```java
public class StudentGrades {
    public static void main(String[] args) {
        int[] studentIDs = {5534, 2238, 6598, 7922, 4973};
        int[] numGrades = {4, 2, 3, 1, 2};
        int[] grades = {87, 92, 33, 65, 79, 92, 88, 95, 75, 99, 68, 72};

        int gradeIndex = 0;
        for ( int i = 0 ; i < studentIDs.length ; i++ ) {
            System.out.print("Student ID = " + studentIDs[i] + " " +
                                "Count = " + numGrades[i] + " " +
                                "Grades = ");

            for ( int j = 0 ; j < numGrades[i] ; j++ ) {
                System.out.print(grades[gradeIndex++] + " ");
            }

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

Output from this solution:

```
Student ID = 5534 Count = 4 Grades = 87 92 33 65
Student ID = 2238 Count = 2 Grades = 79 92
Student ID = 6598 Count = 3 Grades = 88 95 75
Student ID = 7922 Count = 1 Grades = 99
Student ID = 4973 Count = 2 Grades = 68 72
```

3. (20 Points) What is the output of the following program?

```java
public class Switch1 {

    public static void main(String[] args) {
        for (int i = 10; i >= 0; i -= 2) {
            switch (i) {
            case 0:
                    System.out.println(i + ":" + i);
                    break;
            case 2:
                    System.out.println(i + ":" + (i * 5) % 3);
            case 4:
                    System.out.println(i + ":" + (i * 3) % 5);
                    break;
            case 6:
                    System.out.println(i + ":" + (i * 4) % 9);
            case 8:
                    System.out.println(i + ":" + (i * 5) % 6);
            default:
                    System.out.println(i + ":" + (i * 2) % 8);
                    break;
            }
        }
    }
}
```

Output:

```
10:4
8:4
8:0
6:6
6:0
6:4
4:2
2:1
2:1
0:0
```

4. (20 Points) What is the output of the following program?

```java
public class BreakContinue1 {

    public static void main(String[] args) {
        for (int i = 0; i <= 6; i += 2) {
            int j = 6;
            while (j >= 0) {
                if (i == j) {
                    break;
                } else if (i > j--) {
                    continue;
                }
                System.out.println("i = " + i + " : " + "j = " + j);
                j--;
            }
        }
    }
}
```

Output:

```
i = 0 : j = 5
i = 0 : j = 3
i = 0 : j = 1
i = 2 : j = 5
i = 2 : j = 3
i = 4 : j = 5
```

5. (40 Points) Write a complete Java program thar prompts the user to input five pairs of numbers: A
    player's jersey number (0 - 99) and the player's rating (1 - 9). Store the jersey numbers in one int array
    and the ratings in another int array. Your prompts should appear as follows:

```
Enter player 1's jersey number: 84
Enter player 1's rating: 7

...

Enter player 5's jersey number: 23
Enter player 5's rating: 4
```

Implement a menu of options that allows the user to view the roster and modify player ratings. Each
option is represented by a single character. The program initially outputs the menu, and outputs the
menu after a user chooses an option. The program ends when the user chooses the option to Quit. Your
menu should appear as follows:

```
MENU
o - Output roster
u - Update player rating
a - Output players above a rating
q - Quit

Choose an option:
```

Choosing 'Output roster' should produce output that appears as follows:

```
ROSTER
Player 1 -- Jersey number: 84, Rating: 7
Player 2 -- Jersey number: 23, Rating: 4
   ...
```

Choosing the 'Update player rating' should Prompt the user for a player's jersey number. Prompt
again for a new rating for the player, and then change that player's rating.

```
Enter a jersey number: 23
Enter a new rating for player: 6
```

Choosing 'Output players above a rating' should prompt the user for a rating and then print the
jersey number and rating of all players with ratings above the specified rating:

```
Enter a rating: 5

ABOVE 5
Player 1 -- Jersey number: 84, Rating: 7
   ...
```

Choosing 'Quit' should cause your program to exit.

```java
import java.util.Scanner;

public class PlayerRoster {
    public static void main(String[] args) {
        final int MAX_PLAYERS = 5;
        int[] jerseyNums = new int[MAX_PLAYERS];
        int[] playerRating = new int[MAX_PLAYERS];
        Scanner scnr = new Scanner(System.in);

        // read in the players uniform numbers and their ratings
        for (int i = 0; i < MAX_PLAYERS; i++) {
            // prompt and get player's jersey number
            System.out.print("Enter player " + (i+1) + "'s jersey number: ");
            int jersey = scnr.nextInt();
            jerseyNums[i] = jersey;
            System.out.println();

            // prompt and get player's rating
            System.out.print("Enter player " + (i+1) + "'s rating: ");
            int rating = scnr.nextInt();
            playerRating[i] = rating;
            System.out.println();
            System.out.println();
        }

        boolean done = false;
        String command = scnr.nextLine();

        // loop until user quits
        while (!done) {
            // display menu
            System.out.println("MENU");
            System.out.println("o - Output roster");
            System.out.println("u - Update player rating");
            System.out.println("a - Output players above a rating");
            System.out.println("q - Quit");
            System.out.println("");
            System.out.println("Choose an option: ");

            // get user selection
            command = scnr.nextLine();

            if (command.contains("q") || command.contains("Q")) {
                // user selected Quit
                done = true;
            } else if (command.contains("o") || command.contains("O")) {
                // user selected Output roster

                // display the roster
                System.out.println("ROSTER");
                for (int i = 0; i < MAX_PLAYERS; i++) {
                    System.out.println("Player " + (i + 1) +
                                       " -- Jersey number: " + jerseyNums[i] +
                                       ", Rating: "   + playerRating[i]);
                }
                System.out.println();
            } else if (command.contains("u") || command.contains("U")) {
                // user select Update player rating

                // ask for player jersey numbers
```

```java
            System.out.print("Enter a jersey number: ");
            int jersey = scnr.nextInt();

            // find the player with specified jersey number
            int i;
            for (i = 0; i < MAX_PLAYERS; i++) {
                if (jerseyNums[i] == jersey) {
                    break;
                }
            }

            // prompt for new rating
            System.out.print("Enter new rating for player: ");
            int rating = scnr.nextInt();

            // set the new rating
            playerRating[i] = rating;

            // clear any extra characters in the input stream
            command = scnr.nextLine();
        } else if (command.contains("a") || command.contains("A")) {
            // user selected Output players above a rating

            // prompt for the rating
            System.out.println("Enter a rating: ");
            int rating = scnr.nextInt();

            // display all players above specified rating
            System.out.println("ABOVE " + rating);
            for (int i = 0; i < MAX_PLAYERS; i++) {
                if (playerRating[i] > rating) {
                    System.out.println("Player " + (i + 1) +
                                        " -- Jersey number: " + jerseyNums[i] +
                                        ", Rating: "     + playerRating[i]);
                }
            }
            System.out.println();

            // clear any extra characters in the input stream
            command = scnr.nextLine();
        }
    }

    scnr.close();
    return;
    }
}
```

1. (10 Points) true or false?

a. Given the following variable definitions:
 	
``
int total = 0;
 	
for (int i = 1 ; i <= 5 ; i++) {
   total += i * 3;
}
 	
total has the value 45 at the end of the for loop
``
	true
	
	or
	
	false

b. Given the following variable definitions:
 	
``
String s = "Mississippi";
char c1 = s.charAt(2);
char c2 = s.charAt(9);
 	
boolean b = (c1 == c2);   // b evaluates to:
``
	true
	
	or
	
	false

c. Given the following variable definition:
 	
``
String userString = "Chicago Cubs, 2016 World Series Champions";
``
 	
The following expression:
 	
``
Character.isLetter(userString.charAt(11)); // evaluates to:
``
	true
	
	or
	
	false

d. Given:
 	
``
for (int i = 0 ; i < 5 ; i++) {
   if ((i % 2) == 1) {
      continue;
   } else {
      System.out.println("i = " + i);
   }
}
``
 	
The loop will print output for i = 2 & i = 4 only.
	true
	
	or
	
	false

e. Given the following array definition:
 	
``
int[] arr = new int[10];
``
 	
The following loop will loop 10 times:
 	
``
for (int i = 0 ; i < arr.length ; i++) {
   arr[i] += 1;
}
``
	true
	
	or
	
	false

2. (30 Points) Given three arrays (colors added for emphasis):

```
int[] uniformNumbers = {33, 78, 42, 17, 25}; // array of uniform numbers
int[] numQuarters = {3, 2, 4, 1, 2}; // array of number of quarters
int[] points = {10, 12, 11, 14, 16, 17, 19, 11, 18, 10, 14, 16}; // array of points
scored
```

Your program should produce the following output:

```
Uniform Number = 33 Quarters Played = 3 Points Scored = 10 12 11
Uniform Number = 78 Quarters Played = 2 Points Scored = 14 16
Uniform Number = 42 Quarters Played = 4 Points Scored = 17 19 11 18
Uniform Number = 17 Quarters Played = 1 Points Scored = 10
Uniform Number = 25 Quarters Played = 2 Points Scored = 14 16
```

Solution:

```java
public class PlayerPoints {
    public static void main(String[] args) {
        int[] uniformNumbers = {33, 78, 42, 17, 25};
        int[] numQuarters = {3, 2, 4, 1, 2};
        int[] points = {10, 12, 11, 14, 16, 17, 19, 11, 18, 10, 14, 16};

        int pointIndex = 0;
        for ( int i = 0 ; i < uniformNumbers.length ; i++ ) {
            System.out.print("Uniform Number = " + uniformNumbers[i] + " " +
                             "Quarters Played = " + numQuarters[i] + " " +
                             "Points Scored = ");

            for ( int j = 0 ; j < numQuarters[i] ; j++ ) {
                System.out.print(points[pointIndex++] + " ");
            }

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

Output from this solution:

```
Uniform Number = 33 Quarters Played = 3 Points Scored = 10 12 11
Uniform Number = 78 Quarters Played = 2 Points Scored = 14 16
Uniform Number = 42 Quarters Played = 4 Points Scored = 17 19 11 18
Uniform Number = 17 Quarters Played = 1 Points Scored = 10
Uniform Number = 25 Quarters Played = 2 Points Scored = 14 16
```

3. (20 Points) What is the output of the following program?

```java
public class Switch2 {

    public static void main(String[] args) {
        for (int i = 15; i >= 0; i -= 3) {
            switch (i) {
            case 0:
                System.out.println(i + ":" + i);
            case 3:
                System.out.println(i + ":" + (i * 5) % 4);
                break;
            case 6:
                System.out.println(i + ":" + (i * 3) % 7);
            case 9:
                System.out.println(i + ":" + (i * 4) % 8);
                break;
            case 12:
                System.out.println(i + ":" + (i * 2) % 9);
            default:
                System.out.println(i + ":" + (i * 3) % 7);
                break;
            }
        }
    }
}
```

Output:

```
15:3
12:6
12:1
9:4
6:4
6:0
3:3
0:0
0:0
```

4. (20 Points) What is the output of the following program?

```
public class BreakContinue2 {

    public static void main(String[] args) {
        for (int i = 0; i <= 9; i += 3) {
            int j = 9;
            while (j >= 0) {
                if (i == j) {
                    break;
                } else if (i > j) {
                    j -= 3;
                    continue;
                }
                System.out.println("i = " + i + " : " + "j = " + j);
                j -= 3;
            }
        }
    }
}
```

Output:

```
i = 0 : j = 9
i = 0 : j = 6
i = 0 : j = 3
i = 3 : j = 9
i = 3 : j = 6
i = 6 : j = 9
```

5. (40 Points) Write a complete Java program thar prompts the user to input five pairs of numbers: A
    player's jersey number (0 - 99) and the player's rating (1 - 9). Store the jersey numbers in one int
    array and the ratings in another int array. Your prompts should appear as follows:

```
Enter player 1's jersey number: 84
Enter player 1's rating: 7

...

Enter player 5's jersey number: 23
Enter player 5's rating: 4
```

Implement a menu of options that allows the user to view the roster and modify player ratings.
Each option is represented by a single character. The program initially outputs the menu, and
outputs the menu after a user chooses an option. The program ends when the user chooses the
option to Quit. Your menu should appear as follows:

```
MENU
o - Output roster
u - Update player rating
a - Output players above a rating
q - Quit

Choose an option:
```

Choosing '`Output roster`' should produce output that appears as follows:

```
ROSTER
Player 1 -- Jersey number: 84, Rating: 7
Player 2 -- Jersey number: 23, Rating: 4
   ...
```

Choosing the '`Update player rating`' should Prompt the user for a player's jersey number.
Prompt again for a new rating for the player, and then change that player's rating.

```
Enter a jersey number: 23
Enter a new rating for player: 6
```

Choosing '`Output players above a rating`' should prompt the user for a rating and then print
the jersey number and rating of all players with ratings above the specified rating:

```
Enter a rating: 5

ABOVE 5
Player 1 -- Jersey number: 84, Rating: 7
   ...
```

Choosing '`Quit`' should cause your program to exit.

```java
import java.util.Scanner;

public class PlayerRoster {
    public static void main(String[] args) {
        final int MAX_PLAYERS = 5;
        int[] jerseyNums = new int[MAX_PLAYERS];
        int[] playerRating = new int[MAX_PLAYERS];
        Scanner scnr = new Scanner(System.in);

        // read in the players uniform numbers and their ratings
        for (int i = 0; i < MAX_PLAYERS; i++) {
            // prompt and get player's jersey number
            System.out.print("Enter player " + (i+1) + "'s jersey number: ");
            int jersey = scnr.nextInt();
            jerseyNums[i] = jersey;
            System.out.println();

            // prompt and get player's rating
            System.out.print("Enter player " + (i+1) + "'s rating: ");
            int rating = scnr.nextInt();
            playerRating[i] = rating;
            System.out.println();
            System.out.println();
        }

        boolean done = false;
        String command = scnr.nextLine();

        // loop until user quits
        while (!done) {
            // display menu
            System.out.println("MENU");
            System.out.println("o - Output roster");
            System.out.println("u - Update player rating");
            System.out.println("a - Output players above a rating");
            System.out.println("q - Quit");
            System.out.println("");
            System.out.println("Choose an option: ");

            // get user selection
            command = scnr.nextLine();

            if (command.contains("q") || command.contains("Q")) {
                // user selected Quit
                done = true;
            } else if (command.contains("o") || command.contains("O")) {
                // user selected Output roster

                // display the roster
                System.out.println("ROSTER");
                for (int i = 0; i < MAX_PLAYERS; i++) {
                    System.out.println("Player " + (i + 1) +
                                       " -- Jersey number: " + jerseyNums[i] +
                                       ", Rating: "  + playerRating[i]);
                }
                System.out.println();
            } else if (command.contains("u") || command.contains("U")) {
                // user select Update player rating

                // ask for player jersey numbers
```

```java
        System.out.print("Enter a jersey number: ");
        int jersey = scnr.nextInt();

        // find the player with specified jersey number
        int i;
        for (i = 0; i < MAX_PLAYERS; i++) {
            if (jerseyNums[i] == jersey) {
                break;
            }
        }

        // prompt for new rating
        System.out.print("Enter new rating for player: ");
        int rating = scnr.nextInt();

        // set the new rating
        playerRating[i] = rating;

        // clear any extra characters in the input stream
        command = scnr.nextLine();
    } else if (command.contains("a") || command.contains("A")) {
        // user selected Output players above a rating

        // prompt for the rating
        System.out.println("Enter a rating: ");
        int rating = scnr.nextInt();

        // display all players above specified rating
        System.out.println("ABOVE " + rating);
        for (int i = 0; i < MAX_PLAYERS; i++) {
            if (playerRating[i] > rating) {
                System.out.println("Player " + (i + 1) +
                                " -- Jersey number: " + jerseyNums[i] +
                                ", Rating: "     + playerRating[i]);
            }
        }
        System.out.println();

        // clear any extra characters in the input stream
        command = scnr.nextLine();
    }
}

scnr.close();
return;
    }
}
```

1. (10 Points) true or false?

a. Given the following variable definitions:
 	
``
int total = 0;
 	
for (int i = 1 ; i <= 5 ; i++) {
   total += i * 4;
}
 	
total has the value 58 at the end of the for loop
``
	true
	
	or
	
	false

b. Given the following variable definitions:
 	
``
String s = "Mississippi";
char c1 = s.charAt(2);
char c2 = s.charAt(6);
 	
boolean b = (c1 == c2);   // b evaluates to:
``
	true
	
	or
	
	false

c. Given the following variable definition:
 	
``
String userString = "Chicago Cubs, 2016 World Series Champions";
``
 	
The following expression:
 	
``
Character.isLetter(userString.charAt(18)); // evaluates to:
``
	true
	
	or
	
	false

d. Given:
 	
``
for (int i = 0 ; i < 5 ; i++) {
   if ((i % 2) == 1) {
       continue;
   } else {
      System.out.println("i = " + i);
   }
}
``
 	
The loop will print output for i = 0 & i = 2 & i = 4 only.
	true
	
	or
	
	false

e. Given the following array definition:
 	
``
int[] arr = new int[10];
``
 	
The following loop will loop 9 times:
 	
``
for (int i = 1 ; i < arr.length ; i++) {
   arr[i] += 1;
}
``
	true
	
	or
	
	false

Answers (shown in green in the solutions):
- a. false
- b. true
- c. false
- d. true
- e. true

2. (30 Points) Given three arrays (colors added for emphasis):

```
int[] studentIDs = {5534, 2238, 6598, 7922, 4973}; // array of student IDs
int[] numGrades = {4, 2, 3, 1, 2}; // array of number of grades for each student
int[] grades = {87, 92, 33, 65, 79, 92, 88, 95, 75, 99, 68, 72};// array of grades
```

Your program should produce the following output:

```
Student ID = 5534 Count = 4 Grades = 87 92 33 65
Student ID = 2238 Count = 2 Grades = 79 92
Student ID = 6598 Count = 3 Grades = 88 95 75
Student ID = 7922 Count = 1 Grades = 99
Student ID = 4973 Count = 2 Grades = 68 72
```

Solution:

```java
public class StudentGrades {
    public static void main(String[] args) {
        int[] studentIDs = {5534, 2238, 6598, 7922, 4973};
        int[] numGrades = {4, 2, 3, 1, 2};
        int[] grades = {87, 92, 33, 65, 79, 92, 88, 95, 75, 99, 68, 72};

        int gradeIndex = 0;
        for ( int i = 0 ; i < studentIDs.length ; i++ ) {
            System.out.print("Student ID = " + studentIDs[i] + " " +
                                "Count = " + numGrades[i] + " " +
                                "Grades = ");

            for ( int j = 0 ; j < numGrades[i] ; j++ ) {
                System.out.print(grades[gradeIndex++] + " ");
            }

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

Output from this solution:

```
Student ID = 5534 Count = 4 Grades = 87 92 33 65
Student ID = 2238 Count = 2 Grades = 79 92
Student ID = 6598 Count = 3 Grades = 88 95 75
Student ID = 7922 Count = 1 Grades = 99
Student ID = 4973 Count = 2 Grades = 68 72
```

3. (20 Points) What is the output of the following program?

```java
public class Switch3 {

    public static void main(String[] args) {
        for (int i = 20; i >= 0; i -= 4) {
            switch (i) {
            case 0:
                System.out.println(i + ":" + i);
                break;
            case 4:
                System.out.println(i + ":" + (i * 5) % 3);
            case 8:
                System.out.println(i + ":" + (i * 3) % 5);
                break;
            case 12:
                System.out.println(i + ":" + (i * 4) % 9);
            case 16:
                System.out.println(i + ":" + (i * 2) % 3);
            default:
                System.out.println(i + ":" + (i * 3) % 7);
                break;
            }
        }
    }
}
```

Output:

```
20:4
16:2
16:6
12:3
12:0
12:1
8:4
4:2
4:2
0:0
```

4. (20 Points) What is the output of the following program?

```java
public class BreakContinue3 {

    public static void main(String[] args) {
        for (int i = 0; i <= 12; i += 4) {
            int j = 12;
            while (j >= 0) {
                if (i == j) {
                    break;
                } else if (i > j) {
                    j -= 4;
                    continue;
                }
                System.out.println("i = " + i + " : " + "j = " + j);
                j -= 4;
            }
        }
    }
}
```

Output:

```
i = 0 : j = 12
i = 0 : j = 8
i = 0 : j = 4
i = 4 : j = 12
i = 4 : j = 8
i = 8 : j = 12
```

5. (40 Points) Write a complete Java program thar prompts the user to input five pairs of numbers: A player's jersey number (0 - 99) and the player's rating (1 - 9). Store the jersey numbers in one int array and the ratings in another int array. Your prompts should appear as follows:

```
Enter player 1's jersey number: 84
Enter player 1's rating: 7

...

Enter player 5's jersey number: 23
Enter player 5's rating: 4
```

Implement a menu of options that allows the user to view the roster and modify player ratings. Each option is represented by a single character. The program initially outputs the menu, and outputs the menu after a user chooses an option. The program ends when the user chooses the option to Quit. Your menu should appear as follows:

```
MENU
o – Output roster
u – Update player rating
a – Output players above a rating
q – Quit

Choose an option:
```

Choosing '`Output roster`' should produce output that appears as follows:

```
ROSTER
Player 1 -- Jersey number: 84, Rating: 7
Player 2 -- Jersey number: 23, Rating: 4
   ...
```

Choosing the '`Update player rating`' should Prompt the user for a player's jersey number. Prompt again for a new rating for the player, and then change that player's rating.

```
Enter a jersey number: 23
Enter a new rating for player: 6
```

Choosing '`Output players above a rating`' should prompt the user for a rating and then print the jersey number and rating of all players with ratings above the specified rating:

```
Enter a rating: 5

ABOVE 5
Player 1 -- Jersey number: 84, Rating: 7
   ...
```

Choosing '`Quit`' should cause your program to exit.

```java
import java.util.Scanner;

public class PlayerRoster {
    public static void main(String[] args) {
        final int MAX_PLAYERS = 5;
        int[] jerseyNums = new int[MAX_PLAYERS];
        int[] playerRating = new int[MAX_PLAYERS];
        Scanner scnr = new Scanner(System.in);

        // read in the players uniform numbers and their ratings
        for (int i = 0; i < MAX_PLAYERS; i++) {
            // prompt and get player's jersey number
            System.out.print("Enter player " + (i+1) + "'s jersey number: ");
            int jersey = scnr.nextInt();
            jerseyNums[i] = jersey;
            System.out.println();

            // prompt and get player's rating
            System.out.print("Enter player " + (i+1) + "'s rating: ");
            int rating = scnr.nextInt();
            playerRating[i] = rating;
            System.out.println();
            System.out.println();
        }

        boolean done = false;
        String command = scnr.nextLine();

        // loop until user quits
        while (!done) {
            // display menu
            System.out.println("MENU");
            System.out.println("o - Output roster");
            System.out.println("u - Update player rating");
            System.out.println("a - Output players above a rating");
            System.out.println("q - Quit");
            System.out.println("");
            System.out.println("Choose an option: ");

            // get user selection
            command = scnr.nextLine();

            if (command.contains("q") || command.contains("Q")) {
                // user selected Quit
                done = true;
            } else if (command.contains("o") || command.contains("O")) {
                // user selected Output roster

                // display the roster
                System.out.println("ROSTER");
                for (int i = 0; i < MAX_PLAYERS; i++) {
                    System.out.println("Player " + (i + 1) +
                                       " -- Jersey number: " + jerseyNums[i] +
                                       ", Rating: "   + playerRating[i]);
                }
                System.out.println();
            } else if (command.contains("u") || command.contains("U")) {
                // user select Update player rating

                // ask for player jersey numbers
```

```java
            System.out.print("Enter a jersey number: ");
            int jersey = scnr.nextInt();

            // find the player with specified jersey number
            int i;
            for (i = 0; i < MAX_PLAYERS; i++) {
                if (jerseyNums[i] == jersey) {
                    break;
                }
            }

            // prompt for new rating
            System.out.print("Enter new rating for player: ");
            int rating = scnr.nextInt();

            // set the new rating
            playerRating[i] = rating;

            // clear any extra characters in the input stream
            command = scnr.nextLine();
        } else if (command.contains("a") || command.contains("A")) {
            // user selected Output players above a rating

            // prompt for the rating
            System.out.println("Enter a rating: ");
            int rating = scnr.nextInt();

            // display all players above specified rating
            System.out.println("ABOVE " + rating);
            for (int i = 0; i < MAX_PLAYERS; i++) {
                if (playerRating[i] > rating) {
                    System.out.println("Player " + (i + 1) +
                                    " -- Jersey number: " + jerseyNums[i] +
                                    ", Rating: "     + playerRating[i]);
                }
            }
            System.out.println();

            // clear any extra characters in the input stream
            command = scnr.nextLine();
        }
    }

    scnr.close();
    return;
    }
}
```

Solutions
Version 4

1. (10 Points) true or false?

a. Given the following variable definitions:
 	
`int total = 0;`
 	
`for ( int i = 1 ; i <= 5 ; i++ ) {`
`   total += i * 5;`
`}`
 	
`total has the value 60 at the end of the for loop`
	true
	
	or
	
	false

b. Given the following variable definitions:
 	
`String s = "Mississippi";`
`char c1 = s.charAt(4);`
`char c2 = s.charAt(11);`
 	
`boolean b = (c1 == c2);   // b evaluates to:`
	true
	
	or
	
	false

c. Given the following variable definition:
 	
`String userString = "Chicago Cubs, 2016 World Series Champions";`
 	
The following expression:
 	
`Character.isLetter(userString.charAt(23)); // evaluates to:`
	true
	
	or
	
	false

d. Given:
 	
`for ( int i = 0 ; i < 5 ; i++ ) {`
`   if ((i % 2) == 1) {`
`      continue;`
`   } else {`
`      System.out.println("i = " + i);`
`   }`
`}`
 	
The loop will print output for i = 1 & i = 3.
	true
	
	or
	
	false

e. Given the following array definition:
 	
`int[] arr = new int[10];`
 	
The following loop will loop 5 times:
 	
`for ( int i = 0 ; i < arr.length ; i += 2 ) {`
`   arr[i] += 1;`
`}`
	true
	
	or
	
	false

2. (30 Points) Given three arrays (colors added for emphasis):

```
int[] uniformNumbers = {33, 78, 42, 17, 25}; // array of uniform numbers
int[] numQuarters = {3, 2, 4, 1, 2}; // array of number of quarters
int[] points = {10, 12, 11, 14, 16, 17, 19, 11, 18, 10, 14, 16}; // array of points
scored
```

Your program should produce the following output:

```
Uniform Number = 33 Quarters Played = 3 Points Scored = 10 12 11
Uniform Number = 78 Quarters Played = 2 Points Scored = 14 16
Uniform Number = 42 Quarters Played = 4 Points Scored = 17 19 11 18
Uniform Number = 17 Quarters Played = 1 Points Scored = 10
Uniform Number = 25 Quarters Played = 2 Points Scored = 14 16
```

Solution:

```
public class PlayerPoints {
    public static void main(String[] args) {
        int[] uniformNumbers = {33, 78, 42, 17, 25};
        int[] numQuarters = {3, 2, 4, 1, 2};
        int[] points = {10, 12, 11, 14, 16, 17, 19, 11, 18, 10, 14, 16};

        int pointIndex = 0;
        for ( int i = 0 ; i < uniformNumbers.length ; i++ ) {
            System.out.print("Uniform Number = " + uniformNumbers[i] + " " +
                             "Quarters Played = " + numQuarters[i] + " " +
                             "Points Scored = ");

            for ( int j = 0 ; j < numQuarters[i] ; j++ ) {
                System.out.print(points[pointIndex++] + " ");
            }

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

Output from this solution:

```
Uniform Number = 33 Quarters Played = 3 Points Scored = 10 12 11
Uniform Number = 78 Quarters Played = 2 Points Scored = 14 16
Uniform Number = 42 Quarters Played = 4 Points Scored = 17 19 11 18
Uniform Number = 17 Quarters Played = 1 Points Scored = 10
Uniform Number = 25 Quarters Played = 2 Points Scored = 14 16
```

Solutions
Version 4

3. (20 Points) What is the output of the following program?

```java
public class Switch4 {

    public static void main(String[] args) {
        for (int i = 25; i >= 0; i -= 5) {
            switch (i) {
            case 0:
                System.out.println(i + ":" + i);
                break;
            case 5:
                System.out.println(i + ":" + (i * 5) % 4);
            case 10:
                System.out.println(i + ":" + (i * 3) % 7);
                break;
            case 15:
                System.out.println(i + ":" + (i * 3) % 8);
            case 20:
                System.out.println(i + ":" + (i * 2) % 9);
            default:
                System.out.println(i + ":" + (i * 3) % 7);
                break;
            }
        }
    }
}
```

Output:

```
25:5
20:4
20:4
15:5
15:3
15:3
10:2
5:1
5:1
0:0
```

4. (20 Points) What is the output of the following program?

```java
public class BreakContinue4 {

    public static void main(String[] args) {
        for (int i = 0; i <= 20; i += 5) {
            int j = 15;
            while (j >= 0) {
                if (i == j) {
                    break;
                } else if (i > j) {
                    j -= 5;
                    continue;
                }
                System.out.println("i = " + i + " : " + "j = " + j);
                j -= 5;
            }
        }
    }
}
```

Output:

```
i = 0 : j = 15
i = 0 : j = 10
i = 0 : j = 5
i = 5 : j = 15
i = 5 : j = 10
i = 10 : j = 15
```

5. (40 Points) Write a complete Java program thar prompts the user to input five pairs of numbers: A player's jersey number (0 - 99) and the player's rating (1 - 9). Store the jersey numbers in one int array and the ratings in another int array. Your prompts should appear as follows:

```
Enter player 1's jersey number: 84
Enter player 1's rating: 7

...

Enter player 5's jersey number: 23
Enter player 5's rating: 4
```

Implement a menu of options that allows the user to view the roster and modify player ratings. Each option is represented by a single character. The program initially outputs the menu, and outputs the menu after a user chooses an option. The program ends when the user chooses the option to Quit. Your menu should appear as follows:

```
MENU
o - Output roster
u - Update player rating
a - Output players above a rating
q - Quit

Choose an option:
```

Choosing '**Output roster**' should produce output that appears as follows:

```
ROSTER
Player 1 -- Jersey number: 84, Rating: 7
Player 2 -- Jersey number: 23, Rating: 4
   ...
```

Choosing the '**Update player rating**' should Prompt the user for a player's jersey number. Prompt again for a new rating for the player, and then change that player's rating.

```
Enter a jersey number: 23
Enter a new rating for player: 6
```

Choosing '**Output players above a rating**' should prompt the user for a rating and then print the jersey number and rating of all players with ratings above the specified rating:

```
Enter a rating: 5

ABOVE 5
Player 1 -- Jersey number: 84, Rating: 7
   ...
```

Choosing '**Quit**' should cause your program to exit.

```java
import java.util.Scanner;

public class PlayerRoster {
   public static void main(String[] args) {
      final int MAX_PLAYERS = 5;
      int[] jerseyNums = new int[MAX_PLAYERS];
      int[] playerRating = new int[MAX_PLAYERS];
      Scanner scnr = new Scanner(System.in);

      // read in the players uniform numbers and their ratings
      for (int i = 0; i < MAX_PLAYERS; i++) {
         // prompt and get player's jersey number
         System.out.print("Enter player " + (i+1) + "'s jersey number: ");
         int jersey = scnr.nextInt();
         jerseyNums[i] = jersey;
         System.out.println();

         // prompt and get player's rating
         System.out.print("Enter player " + (i+1) + "'s rating: ");
         int rating = scnr.nextInt();
         playerRating[i] = rating;
         System.out.println();
         System.out.println();
      }

      boolean done = false;
      String command = scnr.nextLine();

      // loop until user quits
      while (!done) {
         // display menu
         System.out.println("MENU");
         System.out.println("o - Output roster");
         System.out.println("u - Update player rating");
         System.out.println("a - Output players above a rating");
         System.out.println("q - Quit");
         System.out.println("");
         System.out.println("Choose an option: ");

         // get user selection
         command = scnr.nextLine();

         if (command.contains("q") || command.contains("Q")) {
            // user selected Quit
            done = true;
         } else if (command.contains("o") || command.contains("O")) {
            // user selected Output roster

            // display the roster
            System.out.println("ROSTER");
            for (int i = 0; i < MAX_PLAYERS; i++) {
               System.out.println("Player " + (i + 1) +
                                  " -- Jersey number: " + jerseyNums[i] +
                                  ", Rating: "  + playerRating[i]);
            }
            System.out.println();
         } else if (command.contains("u") || command.contains("U")) {
            // user select Update player rating

            // ask for player jersey numbers
```

```java
            System.out.print("Enter a jersey number: ");
            int jersey = scnr.nextInt();

            // find the player with specified jersey number
            int i;
            for (i = 0; i < MAX_PLAYERS; i++) {
               if (jerseyNums[i] == jersey) {
                  break;
               }
            }

            // prompt for new rating
            System.out.print("Enter new rating for player: ");
            int rating = scnr.nextInt();

            // set the new rating
            playerRating[i] = rating;

            // clear any extra characters in the input stream
            command = scnr.nextLine();
         } else if (command.contains("a") || command.contains("A")) {
            // user selected Output players above a rating

            // prompt for the rating
            System.out.println("Enter a rating: ");
            int rating = scnr.nextInt();

            // display all players above specified rating
            System.out.println("ABOVE " + rating);
            for (int i = 0; i < MAX_PLAYERS; i++) {
               if (playerRating[i] > rating) {
                  System.out.println("Player " + (i + 1) +
                                     " -- Jersey number: " + jerseyNums[i] +
                                     ", Rating: "     + playerRating[i]);
               }
            }
            System.out.println();

            // clear any extra characters in the input stream
            command = scnr.nextLine();
         }
      }

      scnr.close();
      return;
   }
}
```

Exam 2

Solutions
Version 4

Name:_____