



CS213: Object-Oriented Programming

Summer Semester (May - Aug 2024)

Assignment 2

STATEMENT ABOUT ACADEMIC HONESTY AND INTEGRITY

Academic honesty and integrity are very important at Ashesi and central to the achievement of our mission: To train a new generation of ethical and entrepreneurial leaders in Africa to cultivate within our students the critical thinking skills, concern for others, and the courage it will take to transform a continent. As this mission is our moral campus, we recommend you take it seriously in this course without any exceptions at all.

Ashesi therefore does not condone any form of academic dishonesty, including plagiarism and cheating on tests and assessments, amongst other such practices. Ashesi requires students to always do their own assignments and to produce their own academic work unless given a group assignment.

As stated in Ashesi's student handbook, Section 7.4:

"Academic dishonesty includes plagiarism, unauthorized exchange of information or use of material during an examination, unauthorized transfer of information or completed work among students, use of the same paper in more than one course, unauthorized collaboration on assignments, and other unethical behaviour. Disciplinary action will be taken against perpetrators of academic dishonesty."

All forms of academic dishonesty are viewed as misconduct under Ashesi Student Rules and Regulations. Students who make themselves guilty of academic dishonesty will be brought before the Ashesi Judicial Committee and such lack of academic integrity will have serious consequences for your academic records.

INSTRUCTIONS:

1. This is an individual assignment. So, every student must independently work and submit.
2. This assignment encompasses the concept of Java Arrays.
3. This lab assignment contains two questions. You are required to solve both of them.
4. Each question carries 10 points. So, the total assignment will be evaluated for 20 points.
5. Your solution programs should contain comments explaining the program statements that involve important computations.
6. Alongside your program file, you are required to show the execution of your programs as a screen-recorded video (max 5 min).
7. You need to upload the following to the submission portal.
 - ✓ your original '.java' files (by the deadline)
 - ✓ a screen-recorded video of your program execution (by the deadline)
8. Points for each question are awarded as follows.
 - ✓ Solution program: 4 points
 - ✓ Comments on program statements: 1 point
 - ✓ Correct execution: 3 points
 - ✓ Video presentation: 2 points (Please note that this may impact the points given for the other three elements above)
9. The deadline for submission is **6th July 2024, 11.55 PM**.
10. Please refer to the course outline/syllabus document for the late submission policy.

Note: The assignment will be critically evaluated and checked thoroughly for evidence of AI-written code. If any part of the code is found copied or borrowed from AI-powered tools, students receive a ZERO (or FAIL) grade for the total assignment.

PROBLEM 1: (Driver's License Exam)

The local Driver's License Office has asked you to write a program that grades the written portion of the driver's license exam.

The exam has 20 multiple-choice questions.

Here are the correct answers:

1. B	6. A	11. B	16. C
2. D	7. B	12. C	17. C
3. A	8. A	13. D	18. B
4. A	9. C	14. A	19. D
5. C	10. D	15. D	20. A

To pass the exam, a candidate must correctly answer 15 of the 20 questions.

Write a Java program that grades the students as indicated and determines whether a candidate has passed or failed.

You may use arrays to hold the correct answers and students' answers.

Also, you are expected to use the following methods:

- `passed`. Returns `true` if the student passed the exam, or `false` if the student failed
- `totalCorrect`. Returns the total number of correctly answered questions
- `totalIncorrect`. Returns the total number of incorrectly answered questions
- `questionsMissed`. Returns an `int` array containing the question numbers of the questions that the student missed

A sample execution of the program may involve a user entering a student's answers, and then displaying the results returned by invoking the above methods.

Input Validation: Only accept the letters A, B, C, or D as answers.

PROBLEM 2: (Lottery Application)

Write a Java program that simulates a lottery. The program should have an array of five integers named `lotteryNumbers`. The program should use the **Random** class (from the Java API) to generate a random number in the range of 0 through 9 for each element in the array. The class should also have a method that accepts an array of five integers that represent a person's lottery picks. The method is to compare the corresponding elements in the two arrays and return the number of digits that match. For example, the following shows the `lotteryNumbers` array and the user's array with sample numbers stored in each.

There are two matching digits (at indexes 2 and 4).

`lotteryNumbers` array:

7	4	9	1	3
---	---	---	---	---

`userArray`:

4	2	9	7	3
---	---	---	---	---

In addition, the program should have a method that returns a copy of the `lotteryNumbers` array. Demonstrate the program that asks the user to enter five numbers. The program then should display the number of digits that match the randomly generated lottery numbers. If all of the digits match, display a message proclaiming the user a grand prize winner.