# Assignment 2: Chapter 3, “Using Classes and Objects” (8%)

This programming project should be completed and submitted by the end of Week 6, and is worth 8% of your final grade. Please refer to the “Assignment Instructions” for details on the marking rubric and submission instructions.

1. Write an application that prompts for and reads the user’s first and last name (separately), then displays a string composed of the first letter of the user’s first name, followed by the first five characters of the user’s last name, followed by a random number in the range of 10 to 99. Assume that the last name is at least five letters long. Similar algorithms are sometimes used to generate usernames for new computer accounts.

**Testing:** If the inputs were “Michael” and “Jackson,” the output should look like “MJacks42.” Include several tests with different inputs.

1. Write an application that reads the (x,y) coordinates for two points. This should prompt for and read each of the four values individually. Compute the distance between the two points using the following formula:

**Testing:** Include test exhibits for the following inputs:

(1, 2) and (1, 2) are distance 0

(4, 0) and (2, 0) are distance 2

(0, 0) and (3, 4) are distance 5

(0, 0) and (1, 1) are distance 1.414... (i.e. the square root of 2)

1. Write an application that reads the radius of a sphere and prints its volume and surface area. Use the following formulas, in which r represents the sphere’s radius. Print the output to four decimal places.  
   Volume = 4/3 π r3

Surface Area = 4 π r2

**Hint:** Section 3.5 of the textbook describes the many methods of the Math class and how they are used. The Math class also contains pre-defined constants like π. Search on the web for how you can use these.

**Testing:** Include test exhibits for inputs that you choose. Make sure you check the results with a calculator!

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| **Assignment Marking Criteria** | **Weighting** |
| **Correctness of solution:** Algorithm is implemented and produces correct results for the stated problem | /4 |
| **Testing:** Submission of test exhibits to indicate the solution works for a range of cases (e.g. minimum and maximum inputs) and handles unexpected exceptions | /2 |
| **Comments and documentation:** Source code contains comments that explain in plain English what the code is intended to do  **Note:** Javadoc style is **not** required. | /2 |