**Computer Programming 12**

**Review Week Problems**

***Instructions:*** Using your chosen language (Java or Python), complete each of the following problems in a single project file. Problems are organized by topic in the table below. Some are independent challenges to be solved, others (highlighted in gray) should be integrated into your work at places you choose yourself. Your program should solve all of the problems in one file through a menu that allows me to choose which problem I want to view the solution to while the program is running – you will get credit for the **method (of various forms)** part of this assignment for doing this as well!

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| **Topic** | **Problem** |
| Comments | \*\* Comments should **always** be embedded in every project you create. They should be used to document descriptions of sections of code to help keep things organized and describe larger algorithms/solutions. Include them throughout your work on these review problems! |
| Imports (using external libraries) | Implement **at least one** example of an external library import (ex: randomizer, math, time, etc.) that you **use** in a solution for one of the other problems below. |
| Creating, accessing, and changing variables | Throughout your problems, I **must** see you use **at least one** example of each of the following variable types: int, float, bool, String |
| Casting variables to different types of data | Create a small program that takes a user’s input and allows them to choose which type of data they want it turned into (ex: if input is ‘2’, it could be turned into a float ‘2.0’ or a String “2”; make sure you use casting!! |
| Conditional Logic (if statements) | Create a **grade calculator** that reports the grade score as well as a customized message for any percentage score being processed (including below 0 and above 100). |
| Loops (both for and while) | **For loop** – Create a program that asks the user to choose a starting number, an ending number, and a gap (how many numbers to skip) that then prints out every number between the bottom and top separated by the gap.  Ex: User input low: 3, high: 15, gap: 4 … output would be -> 3, 5, 7, 9, 11, 13, 15  Ex2: User input low: -8, high: 44, gap: 11 … output -> -8, 3, 14, 25, 36  **While loop** – Create a guessing game that only ends when the user guesses the right number. Provide some hints to make it fair! |
| Operators (+, -, \*, /, %) | Create a program that calculates tax on a purchase and adds it to the total cost of the item. In addition, add another component to this program that allows the user to input a bank balance and item cost that reports how many of that item they can afford to buy. |
| Comparitors (>, <, ==, not, and, or) | \*\* should be embedded in your other problems \*\* |
| Arrays/Lists | Create a program that allows the user to enter as many values as they want and then calculates the lowest, highest, and average value using arrays or lists. |

(more on next page)

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| **Topic** | **Problem** |
| Classes/Objects | Create a class called ‘Person’ with the following:   * Instance variables (at the top of class) for name, age, and favorite quote * Getters/setters for each of these variables * A constructor that requires an initial value for all variables   Then, create a program that allows the user to initialize and edit their own person object |
| Methods (of various forms) | \*\* Credit given for the overall organization of your program. There should be a main menu the user chooses from, and each solution should be packaged in its own method. \*\* |

**Assessment**

For this project, you will be assessed on 3 rubrics: your ability to integrate our review topics, the experience the created program provides, and quality of written code. Each are described in more detail below!

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| **Topic** | **Score**  **0 = incomplete**  **1 = complete with significant issues**  **2 = complete with minor issues**  **3 = fully complete** |
| Comments |  |
| Imports (using external libraries) |  |
| Creating, accessing, and changing variables |  |
| Casting variables to different types of data |  |
| Conditional Logic (if statements) |  |
| Loops (both for and while) |  |
| Operators (+, -, \*, /, %) |  |
| Comparitors (>, <, ==, not, and, or) |  |
| Arrays/Lists |  |
| Classes/Objects |  |
| Methods (of various forms) |  |