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Solve the following problems. If necessary, include code, images, or scanned drawings to support your answer. Submit your solutions as a pdf. Attach Java source files as needed.

Question:	1	2	3	4	5	Total
Points:	100	100	100	100	100	500
Score:						

Week 3 Exercises: Problem Patterns

1. (100 points) For the following word problems, identify the most important concepts from our in-class categories that you would need to solve the problem using code. You do not have to solve the problems using code.
   Reminder, the concepts are: Input, Output, Math Operations, Text Operations, Variables, If Statements, Conditions, Logical Operations, Loops, Grouping Actions, and Grouping Data (Real-World Timing is bonus. It won't be in here)

   a. Get the user's name as input, and combine it with the words "What's Up, " before the name, then print the full statement.

   Input, variables, text operations, outputs

   b. Display a random number that the computer generates.

   Math operations, output, variable

   c. Get a month as input and determine what season that month is in. Display the season.

   input, variable, output, text operation, math operations

   d. Take a number as input, determine its factorial, and print the result. (Reminder: factorial is a multiplication of all values between 1 and the input)

   input, variable, math operation, output, loops, conditions

2. (100 points) Many programming problems, even ones that look vastly different, have similar patterns when we think at a concept level.
These questions will ask you to identify similarities and differences in specifications.

The following questions have two plain text specifications in each of them.
You do not have to solve these specifications, but to think critically about them.

You must identify for each at least TWO similarities and TWO differences in the problems at a concept level.
This means what concepts you must use to solve the problem, or in how concepts are being used to solve the problem.

a. **Specification 1:** Ask the user to input a score out of 100, and take in this information. Print out the appropriate letter grade ('A', 'B', 'C', 'D', or 'F') based on the course grading scale.
Specification 2: Ask the user to input a year, and take in this information. Check if that year was after 2000, and if so print out "The 21st Century". If the year was before 1900, print out "Ancient History!". Otherwise, print "The 20th Century".

similarities
1) setting inputs from user
2) math operations

differences
1) different number of conditional parameters, num 1 needs else
2) number 1 needs math operations

b. **Specification 1:** Take in five numbers one at a time, sum them, and display the sum of the five numbers.
Specification 2: Take in a series of numbers one at a time. Count the number of values given. When a non-positive value is entered, display the number of values entered.

Similarities
1) Setting variables
2) Math operations

Differences
1) number 2 needs a loop
2) number 2 needs conditions