**Homework: Conditional Statements**

**Problem 1. Exchange If Greater**

* Write an if-statement that takes two double variables a and b and exchanges their values if the first one is greater than the second one. As a result print the values a and b, separated by a space.

*Examples:*

| **a** | **b** | **result** |
| --- | --- | --- |
| 5 | 2 | 2 5 |
| 3 | 4 | 3 4 |
| 5.5 | 4.5 | 4.5 5.5 |

**Problem 2. Bonus Score**

* Write a program that applies bonus score to given score in the range [1…9] by the following rules:
  + If the score is between 1 and 3, the program multiplies it by 10.
  + If the score is between 4 and 6, the program multiplies it by 100.
  + If the score is between 7 and 9, the program multiplies it by 1000.
  + If the score is 0 or more than 9, the program prints “invalid score”.

*Examples:*

| **score** | **result** |
| --- | --- |
| 2 | 20 |
| 4 | 400 |
| 9 | 9000 |
| -1 | invalid score |
| 10 | invalid score |

**Problem 3. Check for a Play Card**

* Classical play cards use the following signs to designate the card face: `2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K and A. Write a program that enters a string and prints “yes” if it is a valid card sign or “no” otherwise. Examples:

| **character** | **Valid card sign?** |
| --- | --- |
| 5 | yes |
| 1 | no |
| Q | yes |
| q | no |
| P | no |
| 10 | yes |
| 500 | no |

**Problem 4. Multiplication Sign**

* Write a program that shows the sign (+, - or 0) of the product of three real numbers, without calculating it.
  + Use a sequence of if operators.

*Examples:*

| **a** | **b** | **c** | **result** |
| --- | --- | --- | --- |
| 5 | 2 | 2 | + |
| -2 | -2 | 1 | + |
| -2 | 4 | 3 | - |
| 0 | -2.5 | 4 | 0 |
| -1 | -0.5 | -5.1 | - |

**Problem 5. The Biggest of 3 Numbers**

* Write a program that finds the biggest of three numbers.

*Examples:*

| **a** | **b** | **c** | **biggest** |
| --- | --- | --- | --- |
| 5 | 2 | 2 | 5 |
| -2 | -2 | 1 | 1 |
| -2 | 4 | 3 | 4 |
| 0 | -2.5 | 5 | 5 |
| -0.1 | -0.5 | -1.1 | -0.1 |

**Problem 6. The Biggest of Five Numbers**

* Write a program that finds the biggest of five numbers by using only five if statements.

*Examples:*

| **a** | **b** | **c** | **d** | **e** | **biggest** |
| --- | --- | --- | --- | --- | --- |
| 5 | 2 | 2 | 4 | 1 | 5 |
| -2 | -22 | 1 | 0 | 0 | 1 |
| -2 | 4 | 3 | 2 | 0 | 4 |
| 0 | -2.5 | 0 | 5 | 5 | 5 |
| -3 | -0.5 | -1.1 | -2 | -0.1 | -0.1 |

**Problem 7. Sort 3 Numbers with Nested Ifs**

* Write a program that enters 3 real numbers and prints them sorted in descending order.
  + Use nested if statements.

*Note: Don’t use arrays and the built-in sorting functionality.*

*Examples:*

| **a** | **b** | **c** | **result** |
| --- | --- | --- | --- |
| 5 | 1 | 2 | 5 2 1 |
| -2 | -2 | 1 | 1 -2 -2 |
| -2 | 4 | 3 | 4 3 -2 |
| 0 | -2.5 | 5 | 5 0 -2.5 |
| -1.1 | -0.5 | -0.1 | -0.1 -0.5 -1.1 |
| 10 | 20 | 30 | 30 20 10 |
| 1 | 1 | 1 | 1 1 1 |

**Problem 8. Digit as Word**

* Write a program that asks for a digit (0-9), and depending on the input, shows the digit as a word (in English).
  + Print “not a digit” in case of invalid input.
  + Use a switch statement.

*Examples:*

| **d** | **result** |
| --- | --- |
| 2 | two |
| 1 | one |
| 0 | zero |
| 5 | five |
| -0.1 | not a digit |
| hi | not a digit |
| 9 | nine |
| 10 | not a digit |

**Problem 9. Play with Int, Double and String**

* Write a program that, depending on the user’s choice, inputs an int, double or string variable.
  + If the variable is int or double, the program increases it by one.
  + If the variable is a string, the program appends \* at the end.
* Print the result at the console. Use switch statement.

*Example 1:*

| **program** | **user** |
| --- | --- |
| Please choose a type: |  |
| 1 --> int |  |
| 2 --> double |  |
| 3 --> string | 3 |
|  |  |
| Please enter a string: | hello |
|  |  |
| hello\* |  |

*Example 2:*

| **program** | **user** |
| --- | --- |
| Please choose a type: |  |
| 1 --> int |  |
| 2 --> double | 2 |
| 3 --> string |  |
|  |  |
| Please enter a double: | 1.5 |
|  |  |
| 2.5 |  |

**Problem 10.\* Beer Time**

* A beer time is after 1:00 PM and before 3:00 AM.
* Write a program that enters a time in format “hh:mm tt” (an hour in range [01...12], a minute in range [00…59] and AM / PM designator) and prints beer time or non-beer time according to the definition above or invalid time if the time cannot be parsed. *Note: You may need to learn how to parse dates and times.*

*Examples:*

| **time** | **result** |
| --- | --- |
| 1:00 PM | beer time |
| 4:30 PM | beer time |
| 10:57 PM | beer time |
| 8:30 AM | non-beer time |
| 02:59 AM | beer time |
| 03:00 AM | non-beer time |
| 03:26 AM | non-beer time |

**Problem 11.\* Number as Words**

* Write a program that converts a number in the range [0…999] to words, corresponding to the English pronunciation.

*Examples:*

| **numbers** | **number as words** |
| --- | --- |
| 0 | Zero |
| 9 | Nine |
| 10 | Ten |
| 12 | Twelve |
| 19 | Nineteen |
| 25 | Twenty five |
| 98 | Ninety eight |
| 98 | Ninety eight |
| 273 | Two hundred and seventy three |
| 400 | Four hundred |
| 501 | Five hundred and one |
| 617 | Six hundred and seventeen |
| 711 | Seven hundred and eleven |
| 999 | Nine hundred and ninety nine |

**Problem 12.\* Zero Subset**

* We are given 5 integer numbers. Write a program that finds all subsets of these numbers whose sum is 0.
* Assume that repeating the same subset several times is not a problem.

*Examples:*

| **numbers** | **result** |
| --- | --- |
| 3 -2 1 1 8 | -2 + 1 + 1 = 0 |
|  |  |
| 3 1 -7 35 22 | no zero subset |
|  |  |
| 1 3 -4 -2 -1 | 1 + -1 = 0 |
|  | 1 + 3 + -4 = 0 |
|  | 3 + -2 + -1 = 0 |
|  |  |
| 1 1 1 -1 -1 | 1 + -1 = 0 |
|  | 1 + 1 + -1 + -1 = 0 |
|  |  |
| 0 0 0 0 0 | 0 + 0 + 0 + 0 + 0 = 0 |

*Hint: you may check for zero each of the 31 subsets with 31 if statements.*