Notes:

- The main purpose of this session is to get familiar with MARS MIPS simulator tool and the first two instruction classes (arithmetic & data transfer).

- To download the MARS MIPS simulator, the link from developers (https://bit.ly/3lrKYmg) can be used. Besides, the additional download link (https://bit.ly/3zdHclD) can be used as an alternative.

- The MARS MIPS simulator requires JDK which is downloadable from Oracle website to execute.

- To get a simple MARS MIPS tutorial, please check out this link (https://bit.ly/3lxjqMn) and this link (https://bit.ly/3zl35zc).

- Please note that the register $zero can be described as $0.

- The main purpose of this week is to get familiar with arithmetic instructions.

- **Students must submit their answers to the BKeL system no later than the last period of the lab section. Then, the instructor will evaluate all students' work during the lab section's final period. Please note that we will randomly choose 50% of questions to mark.**

- To submit, please make a zip file that contains all sources for these questions below, each question should be answered in one source file.

Please refer to Section syscall instruction for these exercises.

Question 1. Write a simple MIPS program that can execute these steps:

1. Print a sentence to terminal to request an integer number from user;

2. Collect the number and increase it by 1;

3. Print the result to terminal.

Question 2. Write a small program that is able collect two integer numbers from users and print out the sum of the two numbers.

Question 3. Write a small program that allows users to input values for variables a, b, c, and d. The program then calculates the following expressions and prints the results to terminal.

$$f = (a + b) - (c - d - 2); \tag{1}$$
$$g = (a + b) * 3 - (c + d) * 2; \tag{2}$$

Question 4. Write a small program that allows users to input 5 different integer numbers. The program then prints those numbers in reverse. For example, users input 1, 2, 3, 4, 5; the program should print 5, 4, 3, 2, 1.

Question 5. Write a MIPS program with the following requirements:

1. Declare an integer array with 10 synthetic data elements.

2. Calculate the sum of all array elements.

3. Print the result to the terminal.

Question 6. Write a MIPS program with the following requirements:

1. Declare an integer array with 10 synthetic data elements.

2. Calculate the sum of all odd elements (a[1]], a[3],...).

3. Calculate the sum of all even elements (a[0], a[2],...).

4. Print the results to the terminal.

Question 7. Write a MIPS program that receives 10 integer numbers from users through the terminal and store these numbers into an array. Print the sum of all array elements to the terminal.

Question 8. Write a MIPS program with the following requirements:

1. Declare an integer array with 10 synthetic data elements.

2. Print a sentence to terminal to request an integer number that is greater than 0 and less than 10 (assume that user strictly follow this rule).

3. Print value of the element at index collected from the previous step.

Question 9. Write a MIPS program that reverses an 10 elements integer array. For example, the array initially stores 1, 3, 5, 7, 9, 11, 13, 15, 17, 19; then the program will change the array to be 19, 17, 15, 13, 11, 9, 7, 5, 3, 1.

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