
Notes:

- Students are requested to submit the MIPS program(s)/source code (.asm files) and a report (in pdf) to the elearning no later than 22-Dec-2019. All files need to be compressed into one .zip file before submitting. Assignments must be done individually.
 - Students have to demonstrate program(s) on MARS MIPS. Time and location will be announced later. Students not show up during the demonstration time will get 0 for assignments.
 - **Similarity less than 20% in both MIPS code is allowed. In other words, you will get 0 if your answers are similar to an another student more than 20%.** We will use Stanford MOSS system to check the similarity (<https://theory.stanford.edu/~aiken/moss/>).
 - The report should not contains code. Students should present the algorithms as well as the idea in your implementation.
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Question 1. Given the following MIPS declaration in the data section of a MIPS program

```
.data
nums .word <an integer number>
elems .word <array elements>
```

Where <an integer number> will store the number of elements in the array elems. elems is an integer array whose size is equal to value <an integer number>. You are required to choose those values when developing and testing your program.

1. Write a MIPS program that sort the the array elems in **descending order** using the **quick sort** algorithm. (*3 points*)
2. Calculate the execution time of your program if one instruction requires 1 ns for processing. (*1 point*)

Question 2. Given the following MIPS declaration in the data section of a MIPS program

```
.data
nums .word <an integer number>
elems .word <array elements>
```

Where <an integer number> will store the number of elements in the array elems. elems is an integer array whose size is equal to value <an integer number>. You are required to choose those values when developing and testing your program. Write a MIPS program that:

1. sort the the array elems in **ascending order** at first; (*3 points*)
2. allow users to input an integer number. The program reports position(s) of the number if it exists in the array. Binary search mus be used in this step. (*3 points*)

—————the end—————