Indian Institute of Technology Kharagpur

AUTUMN Semester, 2019
COMPUTER SCIENCE AND ENGINEERING

Computer Organization Laboratory

Assignment-2: MIPS-32 Assembly Language Programming

Full Marks: 20

Time allowed: 6 hours

INSTRUCTIONS: ATTEMPT BOTH PROBLEMS. Make one submission per group of your source code on Moodle. Name your submitted source files following the format `Assgn_2_Prob_1_Grp_<Group_no>.s` **(e.g.** `Assgn_2_Prob_1_Grp_25.s`**), etc. Inside each submitted file, there should be a clear header describing the assignment no., problem no., semester, group no., and names of group members. Liberally comment your code to improve its comprehensibility.**

1. [**Binary Search in MIPS-32**] Write a complete MIPS-32 program to collect an array of eight integers (in ascending order) by the user, and then perform *Binary Search* to find whether a value entered by the user exists in the array. **Collect the numbers from the input console using a loop, and store in memory in an array called "**`array`**". Do not store the numbers as scalars in eight different non-contiguous locations or in eight different registers**. After the input numbers are collected from the user, there should be sanity checking to ensure that the numbers in the array are actually in ascending order; if they are not, print an error message and exit. Otherwise, perform binary search on the array. If the search is successful, the array index at which the element was found is printed to the user with a proper message; otherwise, if search is unsuccessful, a proper message is printed. (10 marks)

2. [**Bubblesort in MIPS-32**] Write a complete MIPS-32 program to collect an array of eight integers by the user, and then perform *Bubblesort* to sort the array in ascending order. **Collect the numbers from the input console using a loop, and store in memory in an array called "**`array`**". Do not store the numbers as scalars in eight different non-contiguous locations or in eight different registers**. After sorting, print the sorted array on the console with a proper message. (10 marks)
