**SWE 514.01 Computer Systems Fall Project**

by

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1. **Assembler**

Firstly, “assemblySource” array list is created to store the instructions that are read from AsmToHex.txt file. The file is read by using BufferedReader object line by line and those lines are added to assemblySource as elements. Then, “assembledProgram” array lisrt is created to store the 24 bit binary version of the assemblySource elements. To calculate the position of the beginning of the loop and jump on nonzero instruction. After that, for loop which runs through the assemblySource array list is created. In this loop, elements are split into parts if they contain space. Then, two if conditions that check the element length and the content of element matches with “LOOP1” keyword or not is created. Thus, the difference between the positions of the elements which contains “LOOP1” keyword is found and this difference is converted to binary version, appropriately. And the third and fourth if conditions check the element length and the content of element by looking whether it is character or digit, respectively. In the second loop, the instructions, addressing modes and the registers are converted to their binary version and added to “assembledProgram” array list. After that, those binary numbers are converted to HEX numbers and added to “assembledProgram2” in the third loop. Finally, assembledProgram2 elements are put into AssembledProgram.txt file by using BufferedWriter object.

1. **Execution Simulator**

Firstly, the “assemblySource” array list is created to store the lines of the AssembledProgram.txt file. The file is read by using BufferedReader object line by line and those lines are added to assemblySource as elements. Then, the accumulator (AC), registers(B, C, D), zero flag (ZF), which equals to zero at the beginning, and the value that memory address B keeps are initialized. Then, integer “a” which initially created as non zero in order to makes zero flag one. After that, elements of assemblySource are split into 2 parts. Then if conditions which check the content of these 2 parts are created. In those if conditions the registers and accumulator are set and the outputs are printed out.