**System Software (CSN-252)**

**SIC-XE Assembler**

**21411005-Amandeep Singh**

The project's goal is to develop a two-pass SIC/XE assembler, consisting of Passes 1 and 2.

The Assembler we created supports all four formats—

1. Format-1 (opcode-8 bits)
2. Format-2 (opcode-8 bits + reg-4 bits + reg-4 bits)
3. Format-3 (opcode-6 bits + nixbpe + disp-12 bits)
4. Format-4 (opcode-6 bits + nixbpe + address-20 bits)

As well as programme relocation and all SIC/XE instructions.

**It also includes all Machine-Independent Assembler Features**:

1. Literals

2. Symbol Defining Statements

3. Expressions

4. Control Sections

**Input to assembler**:

Assembler source program using the instruction set of SIC/XE.

**Output**:

Assembler will generate the following files as output:

* Pass 1 will generate a Symbol Table as well as other tables in tables. (Input\_filename).
* Pass 1 will also generate an Intermediate File (intermediate\_input\_filename.txt) for Pass2.
* Pass 2 will generate a listing file containing the input assembly code and address, block number, object code of each instruction. (listing\_input\_filename.txt)
* Pass 2 will also generate an object program including the following type of record: H, D, R, T, M and E types. (object\_program\_input\_filename.txt)
* An error file is also generated displaying the errors in the assembly program (if any). (error\_input\_filename.txt).

**STEPS TO COMPILE AND EXECUTE ASSEMBLER**

* Download the zip file and open the terminal.
* Compile the file pass2.cpp using the command g++ -std=c++11 pass2.cpp.
* Put the executable pass2.exe and the test inputs in the same folder.
* Now change the directory to Test\_inputs and execute the executable a.exe. (using cd command)
* Write the name of the file you want to run in the given space.
* And when we are done, 4 folders will be created corresponding to the error file, intermediate file, listing file and object code.

**Files Included**

* Pass1.cpp: includes code for pass1 of sic/xe assembler.
* Pass2.cpp: includes code for pass2 of sic/xe assembler.
* Functions.cpp: includes several functions which are used frequently.
* Tables.cpp: includes all the maps and hash tables to be used.