Compiler Design Lab- CS4P001- 01 November 2022 (Set 2)

- Section 1 and 5: Only answers/explanation in the answer sheet to be provided.
- For Sections 2, 3, and 4:
  - In the answer sheet given, write the key parts of your lex /yacc program/specification (provide any brief necessary explanation).
  - Submission of complete implementations (via Google Classroom): Submit the source program files/sample inputs etc separately. Also, include a readme with the screenshots of the executions of your program (mentioning the sample inputs considered).

Section 1- Answer the following briefly

Q1. What is a Lex tool? Briefly describe the structure of a Lex program.
Q2. Explain briefly about YACC tool, and the structure of a YACC program.
Q3. Explain about "yytext" and "yylval".

Section 2- Basic Lex programs

Q1. Write a Lex program that recognizes strings starting with an **"b"** and ending with a **"e"**.

Q2. Write a Lex program that reads the content of a file and displays it by

- Removing all the white-spaces and tabs; and Replace all occurrences of the characters in the set {e, f, v} with a "#" symbol.

Section 3- Basic Lex + Yacc programs

Construct a lexical analyser and a parser for the following simple "C" like language using the Lex and Yacc tools.

1. Data Type : integer (INT/int), Boolean (Bool/bool)
2. Condition construct: **if**
3. Loop Construct: **while**
4. Input / Output Constructs:
   a. in(x) - Read into variable x
   b. out(x) - Write variable x to output
5. Relational operators, assignment and arithmetic operators
6. Only function is **main()**, there is no other function.

Section 4- Attribute/Attribute Translation Grammar(s)

Extend your solution from Section 3, by adding attributes/ attribute evaluation/ actions to handle the following:

- Analyze the total amount of storage needed for the variables declared in the program (consider that integer requires 4 bytes and Bool requires 1 byte). An attribute of type integer attached with the start symbol should give the information about the total amount of storage needed for the variables in Bytes.
- Assigning correct type to each declared variable;

Section 5- Parsing Algorithm(s)- OPTIONAL

Provide algorithm/pseudo-code for LR(1) parser with brief explanation (consider the parse table to be available).