Question 1

2.5 / 2.5 pts

Order the tools given in the dropdown list as per their use in the timeline for a normal compilation and normal execution of a C-program. Note that some processes are NOT needed.

Order from the first-used (step 1) to the last-used (step 5)

Correct! **Step 1** — Preprocessor

Correct! **Step 2** — Compiler

Correct! **Step 3** — Assembler

Correct! **Step 4** — Linker

Correct! **Step 5** — Loader

Other Incorrect Match Options:

- Debugger
- Profiler

Question 2

4 / 4 pts

Match the given regular expressions over alphabet {x, y} on the LHS with an equivalent regular expression from the dropdown. Note that **0 matches** or **more than 1 matches** are also possible. If there are 0 matches, choose **NONE**. If there are more than 1 matches, choose **any ONE of the correct matches**.

You Answered — **(x + y)*xy(x + y)* + x*y*** — NONE

Correct answer — (x + y)*

Correct! — **(xy)*x** — x(yx)*

You Answered — **(x + y)*x(x + y)*y(x + y)** — NONE

Correct answer — (x + y)*xy(x + y)*

You Answered — **(x + y)*y(x + y)*x** — NONE

Correct answer — (x + y)*yx

Other Incorrect Match Options:

- NONE

Question 3

0 / 2.5 pts

Consider the following statements and choose ALL the correct options.

S1: Lexical Analysis phase of a compiler CANNOT be implemented using regular expressions alone.

S2: For the correctness of compilation, the lexical analyzer phase of a compiler needs to take into account the precedence and associativity of the operators in the language.

- ☐ Both S1 and S2 are correct, and S2 is the reason for S1.
- ☐ Both S1 and S2 are correct, however they are unrelated.
- ☐ S1 is incorrect but S2 is correct.

Correct answer — ☐ S1 is correct but S2 is incorrect.

- ☐ Both S1 and S2 are correct, and S1 is the reason for S2.

You Answered — ☑ Both S1 and S2 are incorrect.

Question 4

0 / 3 pts

Which of the following statements are true for a lexical analyzer (LA) generated by a tool like LEX. Here **automatically / default** means user need not provided explicit actions to handle the given scenario.

Correct answer — ☐ LA provides a default action for any input that does not match any of the provided rules.

- ☐ LA can handle keywords for any given programming language with default actions.

You Answered — ☑ The complexity of matching a string of length n is O(n)

You Answered — ☑ LA can automatically keep track of line numbers in the input file but not the column numbers.

Correct! — ☑ LA provides a default action for any rule that does not have an accompanying action.

Question 5

Unanswered — 0 / 2 pts

Consider a lexical analyzer (LA) generated by a tool like LEX. LA is scanning an input of size N. What is the maximum number of characters that LA might have to examine past the END of a token to decide that the token is found?

- ○ O(N*N)
- ○ 0
- ○ O(N)
- ○ 2
- ○ 1

Correct answer — ○ N

Question 6

0 / 4 pts

Explain with an example, why the following Lex pattern which is supposed to represent a comment is **incorrect**:

```
"/*"[^*]*(\*([^/][^*]*)?)*"*/"
```

Your Answer:

Question 7

Unanswered — 0 / 2 pts

Consider the following statements:

S1: Bootstrapping is necessary to develop a compiler for a language L on a new (processor) architecture N.

S2: Existence of a cross-compiler $L_{M}N$ on an existing architecture M is a necessary and sufficient condition for developing a compiler for the language L on a new architecture N.

Correct answer — ◉ Both S1 and S2 are FALSE.

- ○ S1 is FALSE but S2 is TRUE.
- ○ S1 is TRUE but S2 is FALSE.
- ○ Both S1 and S2 are TRUE.