Group 26: We Dead

Members	**Section**	**Group Number**
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Joshua Laxa	S17	26
Felix Mangawang	S15	26

For items 1 to 4, consider the grammar below:

- G = (N, T, P, S)
- N = {S, A, B}
- T = {e, f, c}
- P:
    - $S \rightarrow e\ A\ f\ A$
    - $A \rightarrow e\ B \mid f\ B \mid \varepsilon$
    - $B \rightarrow A \mid c$

1. (10 points) Convert the grammar into CNF. Gavrie

   $S \rightarrow H_0\ A$

   $A \rightarrow H_1\ B \mid H_2\ B \mid \varepsilon$

   $B \rightarrow c \mid H_1\ B \mid H_2\ B \mid \varepsilon$

   $H_0 \rightarrow H_3\ H_2$

   $H_1 \rightarrow e$

   $H_2 \rightarrow f$

   $H_3 \rightarrow H_1\ A$
2. (10 points) Convert the grammar into GNF. Felix

S → e A f A | e A f | e f A | e f

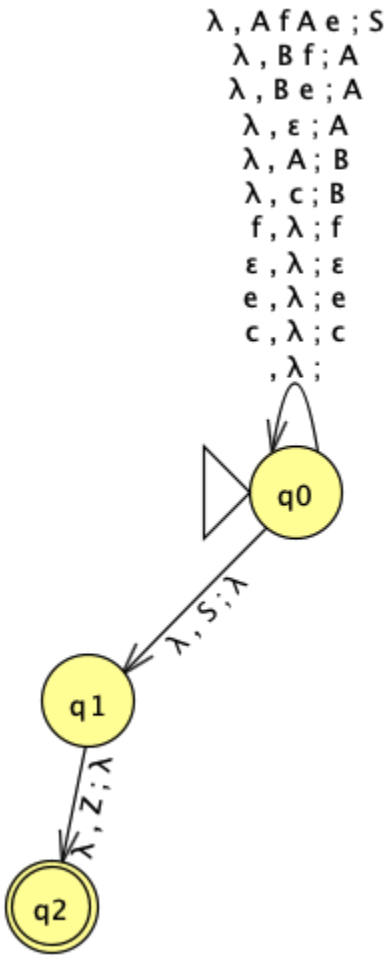
A → e B | f B | e | f

B → c | e B | f B | e | f

3. (10 points) Show the CYK parsing table for eecffc. Write “Error” if it is not possible.

   Error

4. (10 points) Convert it to PDA, provide the state diagram.

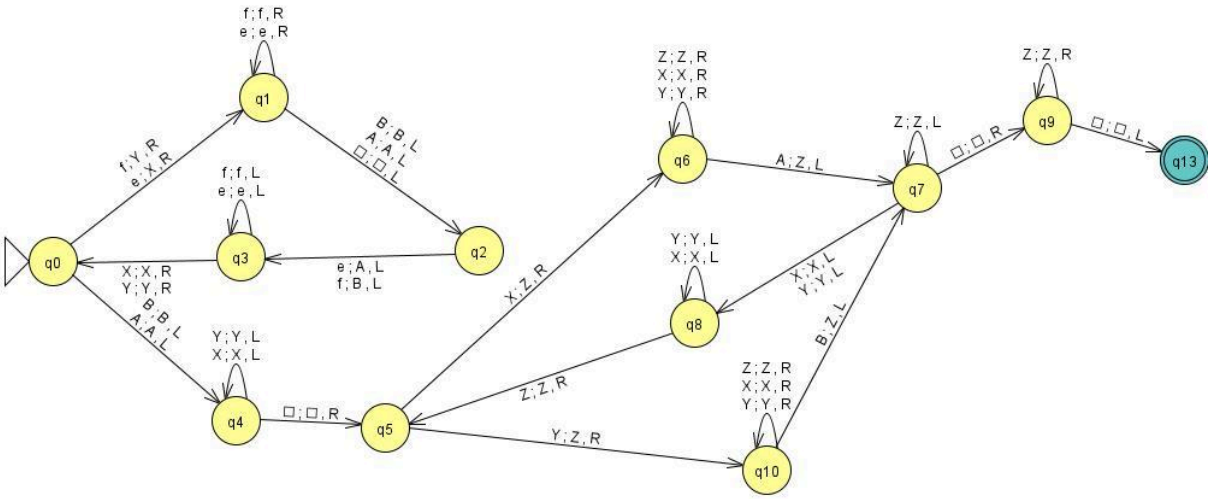


5. (10 points) Design a Turing machine that accepts strings in which the sequence of characters is repeated exactly two times. The input consists of English words (e) and Filipino words (f). There is at least one English word and one Filipino word in the input.

Use JFLAP notation and assume that the tape head points to the first symbol of the input.

a. Accepted: efef, eeefffeeefff, eef

b. Rejected: efefe, eef, ffe, eefeefef



6. (8 points bonus) Each team member must answer the following questions for the entire team to earn bonus points.

   a. For future iterations of the course, would you recommend incorporating games into the problem sets? Why or why not?

      i. Gavrie

         Yes, I recommend incorporating games into problem sets because it helps us see how the topics we are learning can be applied to real-life situations, such as board games like Catan.

      ii. Joshua

         Yes, I think incorporating games is a great idea. It makes abstract topics easier to grasp and keeps us more engaged. It also helps bridge theory and practice in a fun way.

iii. Felix

Yes, absolutely. Gamifying courses should be the norm because games are now easily accessible, and when it is applied to games, we understand it just like how we understand how to play a specific game.

b. For future iterations of the course, would you recommend using grammar-based engines (like LanguageTool) in the case study? Why or why not? You may give recommendations for improvement.

i. Gavrie

It depends, since using LanguageTool was a fun concept. However, the tool was difficult to use because it was messy, and aside from the videos and troubleshooting errors, there was no proper step-by-step guide to using it.

ii. Joshua

LanguageTool has potential, but the learning curve is quite steep. If it will be used again, I wish there would be a clearer documentation or a quick start guide tailored to students with no experience.

iii. Felix

LanguageTool is a good engine for debugging and ensuring the sanity check for the students' code for it to work. In our experience, we had a hard time utilizing LT because it was not beginner-friendly at all. Fortunately, there's a step-by-step tutorial for it.

c. What's one thing you learned in this course that you have applied outside class?

i. Gavrie

The one thing I learned in this course that I have applied outside of class is the Pushdown Automata, as it helped me understand Data Structures and Algorithms even more when answering questions like in LeetCode.

ii. Joshua

Understanding finite automata helped me think about how basic systems work, like how vending machines and input validation function behind the scenes. It made tech around me more understandable.

iii. Felix

The things I have learned in this class may not be specific, but they helped me think more critically about how things work. For example, before, the telephone used FSA because you input one number at a time, and then it connects you to a specific number. With that, I have a whole foundation of understanding now.

d. Which activity or assessment task did you enjoy the most?

i. Gavrie

The activity I enjoyed the most was playing Catan for incentives, as I hoped it would raise my grade for the class.

ii. Joshua

I really enjoyed the Catan gameplay and how we connected it to course topics. It made the concepts less intimidating and more interactive.

iii. Felix

I really enjoyed the games Catan and 6nimmt because they not only gave us a base for problem sets, but due to the topics introduced in this course, we understood the mechanics of the games easily.

e. What was your most liked topic? Least liked topic?

i. Gavrie

My most liked topic was the Closure Properties of Regular Languages since it was the only topic I fully understood and hopefully mastered. My least liked topic was the Pumping Lemma since I had a hard time proving that the string can be pumped in problem sets and exams.

ii. Joshua

My favorite topic was Pushdown Automata because it felt like a natural extension of regular languages. My least favorite was Pumping Lemma. It was tough to apply and felt less intuitive.

iii. Felix

My most liked topic is pushdown automata because the concept is easy to understand, and some problems are easy to apply. My least liked topic may be the pumping lemma because it's a very complicated topic that requires some time to understand.