CENG213 THEORY OF COMPUTATION
ASSIGNMENT #2

Due date: 10.01.2022

1. **(25 points)** $\boldsymbol{L = \{a^n b^m a^m b^n \mid n >= 1, m >= 1\}}$
   i. Write a context-free grammar to generate L.
   ii. Construct a pushdown automaton (PDA) for the language L.

2. **(25 points)** Construct a language generator (grammar) for the following language:

$$L = \{(ba)^k a^n c^t : t \geq 2k + n\}$$

3. **(25 points)** Construct a Turing machine that copies the first three nonblank symbols over the next three blank symbols.

Example: ⊔ ⊔ a ⊔ b ⊔ c ⊔ c b ⊔ a ⊔ ⊔ ⊔ → ⊔ ⊔ a ⊔ b ⊔ c a c b b a c ⊔ ⊔

4. **(25 points)** Construct a Turing machine that **semi-decides** the language ac*bc*a. Does the same machine also **decide** this language? Explain why.

Note: Please do not submit your assignment to any website like Chegg.