METU
NORTHERN CYPRUS CAMPUS

# CNG 280 QUIZ-4 (Assignment)
# 2021-2022 SPRING SEMESTER
# June 08, 2022

**STUDENT NO:**
**FULL NAME:** SECTION: **1&2**

## INSTRUCTIONS

1. Please check your assignment sheet and make sure that it contains 4 questions.
2. Fill in your full name and student number.
3. Answer all questions.
4. Write clearly.
5. Submit on time.

| Questions | Points | Score |
|---|---|---|
| 1 | 60 | |
| 2 | 20 | |
| 3 | 10 | |
| 4 | 10 | |
| Total | 100 | |

**Before answering the questions, you need to follow the steps below and find out your personal alphabet:**

**I. Write your student number.**

**II. Take three distinct digits of your student number *from right to left*. This is your new 3-digit number.**
Examples:
Student #: 113617, 3-digits: 716
Student #: 2152122, 3-digits: 215
If you have confusion, you may ask your TA.

**III. Take each digit in order *from left to right*. These are your alphabet symbols.**
Examples:
For 3-digit #: 716, Your alphabet $\sum$ = {7,1,6}
For 3-digit #: 215, Your alphabet $\sum$ = {2,1,5}

**IV. Using your $\sum$, answer the following questions.**

**QUESTIONS:**

**1.** Design and draw a PDA, say M, for L = {w : $n_x(w) + n_y(w) = n_z(w)$g on $\sum$ = {x,y,z} whereas x,y,z represents the digits in the same order on your alphabet you computed above and $n_i(w)$ means the numbers of i's in w}.
Example: for $\sum$ = {7,1,6} x=7, y=1, z=6

**2.** Describe the algorithm of how you designed M. In other words, describe how M recognizes the elements of L.

3. Create a 4-digit sample input using your alphabet that is **recognized** by M and then show the execution trace (using instantaneous descriptions) of how the input is processed.

4. Create a 4-digit sample input using your alphabet that is **NOT recognized** by M and then show the execution trace (using instantaneous descriptions) of how the input is processed.