Assignment 1

Consider the PDA P = ($\{p, q, r, s\}, \{0,1\}, \{0,1, Z_0), \delta, p, Z_0, \{s\}$) whose transition function is given below.

$$\delta(p, 0, Z_0) = \{(q, 0Z_0)\}, \quad \delta(p, 1, Z_0) = \{(q, 1Z_0)\}, \quad \delta(p, 0,0) = \{(q, 00)\},$$
$$\delta(p, 1,1) = \{(q, 11)\}, \quad \delta(p, 1,0) = \{(q, 10)\}, \quad \delta(p, 0,1) = \{(q, 01)\},$$

$$\delta(q, 0, Z_0) = \{(p, Z_0)\}, \quad \delta(q, 1, Z_0) = \{(p, Z_0)\}, \quad \delta(q, 0,0) = \{(p, 0)\},$$
$$\delta(q, 1,1) = \{(p, 1)\}, \quad \delta(q, 1,0) = \{(p, 0)\}, \quad \delta(q, 0,1) = \{(p, 1)\},$$

$$\delta(q, \epsilon, 0) = \{(r, 0)\}, \quad \delta(q, \epsilon, 1) = \{(r, 1)\},$$

$$\delta(r, 0,0) = \{(r, \epsilon)\}, \quad \delta(r, 1,1) = \{(r, \epsilon)\},$$

$$\delta(r, \epsilon, Z_0) = \{(s, Z_0)\}.$$

For the above PDA, consider the input as follows--

- If your roll number ends in 0 or 5 then the two input strings for you are
  (a) 10111, (b) 111.
- If your roll number ends in 1 or 6 then the two input strings for you are
  (a) 11111, (b) 101.
- If your roll number ends in 2 or 7 then the two input strings for you are
  (a) 00101, (b) 011.
- If your roll number ends in 3 or 8 then the two input strings for you are
  (a) 10010, (b) 110.
- If your roll number ends in 4 or 9 then the two input strings for you are
  (a) 11010, (b) 010.

For example, if your roll number is S20170010148, then since your number is ending in 8, your input strings are (a) 10010, (b) 110.

Problem Statement: For your two input strings, if the string is accepted by the PDA (by final state) then give the accepting sequence of ids showing that the string is in the language of the PDA (by final state). Else if the string is rejected then give the complete computation tree and thus show that every path from root to a leaf will end in rejection.

Submission Guidelines: With your own handwriting write clearly (illegible answers can attract negative marks). Copied answers also attract negative marks.

1. Use A4 size sheet. (Within one page you can write your answer)
2. Write title **ToC Assignment 1** at Top center.
3. Write your **roll number** and **name** at the top right.
4. Put **date** below your roll number and name.
5. Write your **input strings**.
6. For input **string (a) give your answer**.
7. For input **string (b) give your answer**.
8. **Scan** that one page of your solution and upload it in to **google classroom** (exact link will be communicated). You can use your mobile scanner.

Deadline: **31st March (Tuesday) 5 PM**. (Deadline will not be extended).

Only one file in PDF format has to be uploaded. (Uploading two or more files can invalidate your submission)