PR 8 TBFO

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Nama : Raden Francisco Trianto Bratadiningrat
NIM : 13522091

*** Exercise 6.3.1 :** Convert the grammar

$$\begin{aligned} S &\rightarrow 0S1 \mid A \\ A &\rightarrow 1A0 \mid S \mid \epsilon \end{aligned}$$

to a PDA that accepts the same language by empty stack.

PDA : ({q}, {0,1}, {0, 1, A, S}, δ, q, S}

δ(q, ε, S) = {(q, 0S1), (q, A)}

δ(q, ε, A) = {(q, 1A0), (q, S), (q, ε)}

δ(q, 0, 0) = {(q, ε)}

δ(q, 1, 1) = {(q, ε)}

Exercise 6.3.2 : Convert the grammar

$$\begin{aligned} S &\rightarrow aAA \\ A &\rightarrow aS \mid bS \mid a \end{aligned}$$

to a PDA that accepts the same language by empty stack.

PDA : ({q}, {a, b}, {a, b, A, S}, δ, q, S}

δ(q, ε, S) = {(q, aAA)}

δ(q, ε, A) = {(q, aS), (q, bS), (a)}

δ(q, a, a) = {(q, ε)}

δ(q, b, b) = {(q, ε)}

* **Exercise 6.3.3:** Convert the PDA $P = (\{p, q\}, \{0, 1\}, \{X, Z_0\}, \delta, q, Z_0)$ to a CFG, if δ is given by:

1. $\delta(q, 1, Z_0) = \{(q, XZ_0)\}$.
2. $\delta(q, 1, X) = \{(q, XX)\}$.
3. $\delta(q, 0, X) = \{(p, X)\}$.
4. $\delta(q, \epsilon, X) = \{(q, \epsilon)\}$.
5. $\delta(p, 1, X) = \{(p, \epsilon)\}$.
6. $\delta(p, 0, Z_0) = \{(q, Z_0)\}$.

I) Start State

$$S \rightarrow [q\ Z_0\ q]$$
$$S \rightarrow [q\ Z_0\ p]$$

II) dari fungsi (1)

$$[q\ Z_0\ q] \rightarrow 1\ [q X q][q\ Z_0\ q]$$
$$[q\ Z_0\ q] \rightarrow 1\ [q X p][q\ Z_0\ q]$$
$$[q\ Z_0\ p] \rightarrow 1\ [q X q][q\ Z_0\ p]$$
$$[q\ Z_0\ p] \rightarrow 1\ [q X p][q\ Z_0\ p]$$

III) dari fungsi (1)

$$[q \times q] \rightarrow 1\ [q X q][q \times q]$$
$$[q \times q] \rightarrow 1\ [q X p][q \times q]$$
$$[q \times p] \rightarrow 1\ [q X q][q \times p]$$
$$[q \times p] \rightarrow 1\ [q X p][q \times p]$$

IV) dari fungsi 3

$$[q X q] \rightarrow 0\ [p X q]$$
$$[q X p] \rightarrow 0\ [p X p]$$

V) dari fungsi 4

$$[q X q] \rightarrow \varepsilon$$

VI) dari fungsi 5

$$[p X p] \rightarrow 1$$

VII) dari fungsi 6

$$[p\ Z_0\ p] \rightarrow 0\ [q\ Z_0\ q]$$
$$[p\ Z_0\ p] \rightarrow 0\ [q\ Z_0\ p]$$