In-class Exercises CGGs & PDAs

1. Let $\Sigma = \{0, 1\}$. Consider the language:

$$A = \{ 0^k u 0^k \mid k \geq 1 \text{ and } u \in \Sigma^* \}$$

Define the language in each of the ways below (or give an explanation why a particular way is not possible).

NFA:

CFG:

PDA:
2. Let $\Sigma = \{0, 1\}$. Consider the language:

$$B = \{ 0^k 1 u 0^k | k \geq 1 \text{ and } u \in \Sigma^* \}$$

Define the language in each of the ways below (or give an explanation why a particular way is not possible).

NFA:

CFG:

PDA:
3. Let $\Sigma = \{0, 1\}$. Consider the language:

$C = \{ ww^R \mid w \in \Sigma^* \}$ ($w^R$ is the string $w$ reversed)

Define the language in each of the ways below (or give an explanation why a particular way is not possible).

NFA:

CFG:

PDA:
4. Let $\Sigma = \{0,1\}$. Consider the language:

$$C = \{ ww \mid w \in \Sigma^* \}$$

Define the language in each of the ways below (or give an explanation why a particular way is not possible).

NFA:

CFG:

PDA: