

# CSE 303 HW 4

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DATE

1. No null:  $S \rightarrow 0S0 \mid 1S1 \mid X$

$X \rightarrow 0Y1 \mid 1Y0 \mid 01 \mid 10$

$Y \rightarrow 0Y \mid 1Y \mid 0 \mid 1$

No unit:

$S \rightarrow 0S0 \mid 1S1 \mid 0Y1 \mid 1Y0 \mid 01 \mid 10$

$Y \rightarrow 0Y \mid 1Y \mid 0 \mid 1$

No useless: ✓

$X_0 \rightarrow 0$

$X_1 \rightarrow 1$

$S \rightarrow X_0Y_0 \mid X_1Y_1 \mid X_0Y_3 \mid X_1Y_2$

$\dots \mid X_0X_2 \mid X_2X_0$

$Y_0 \rightarrow SX_0$

$Y_1 \rightarrow SX_1$

$Y_2 \rightarrow YX_0$

$Y_3 \rightarrow YX_1$

$Y \rightarrow X_0Y \mid X_1Y \mid 0 \mid 1$

2.