Implement a computer program (either in C or Java) following the specifications of the system given below.

**Applicable Sets**

- $\mathbf{A} : \{x \in \mathbf{Z}^+ \mid x \leq 8\}$
- $\mathbf{P} : \mathbf{A} \times \mathbf{A}$
- $\mathbf{S} : \{(x,y) \in \mathbf{P} \mid (x \bmod 2 = 1 \wedge y \bmod 2 = 0) \vee (x \bmod 2 = 0 \wedge y \bmod 2 = 1)\}$
- $\mathbf{B} : \{\text{true}, \text{false}\}$

**System Variables**

- $Alpha, Beta, Free \subseteq \mathbf{S}$
- $aTurn \in \mathbf{B}$
- $over \in \mathbf{B}$
- $ok \in \mathbf{B}$

**System Facts**

- $Free = \mathbf{S} - (Alpha \cup Beta)$
- $over \leftrightarrow (|Alpha| = 0 \oplus |Beta| = 0)$

**System Initialization**

- $over = \text{false}$
- $ok = \text{false}$
- $aTurn = \text{true}$
- $Alpha = \{(x,y) \in \mathbf{S} \mid x \leq 3\}$
- $Beta = \{(x,y) \in \mathbf{S} \mid x \geq 6\}$

**System States and Behavior**

    **NextPlayerMove**$(prev, next \in \mathbf{S})$

$(a,b) = prev$

$(c,d) = next$

| | | |
|---|---|---|
| $aTurn \wedge prev \in Alpha \wedge c = a+1 \wedge (d = b+1 \vee b = d+1)$ | $\rightarrow$ | $ok = \neg ok$ |
| $\neg aTurn \wedge prev \in Beta \wedge a = c+1 \wedge (d = b+1 \vee b = d+1)$ | $\rightarrow$ | $ok = \neg ok$ |
| $ok \wedge aTurn \wedge next \in Free$ | $\rightarrow$ | $Alpha = Alpha - \{prev\} \cup \{next\}$ $\wedge\, aTurn = \neg aTurn$ $\wedge\, ok = \neg ok$ |
| $ok \wedge \neg aTurn \wedge next \in Free$ | $\rightarrow$ | $Beta = Beta - \{prev\} \cup \{next\}$ $\wedge\, aTurn = \neg aTurn$ $\wedge\, ok = \neg ok$ |
| $ok \wedge aTurn \wedge next \in Beta$ | $\rightarrow$ | $Beta = Beta - \{next\}$ $\wedge Alpha = Alpha - \{prev\} \cup \{next\}$ $\wedge ok = \neg ok$ |
| $ok \wedge \neg aTurn \wedge next \in Alpha$ | $\rightarrow$ | $Alpha = Alpha - \{next\}$ $\wedge Beta = Beta - \{prev\} \cup \{next\}$ $\wedge ok = \neg ok$ |

    **GameOver**$(over)$

$result \in \{\text{Beta Wins}, \text{Alpha Wins}\}$

| | | |
|---|---|---|
| $|Alpha| = 0$ | $\rightarrow$ | $result = \text{Beta Wins}$ |
| $|Beta| = 0$ | $\rightarrow$ | $result = \text{Alpha Wins}$ |