CSE526: Principles of Programming Languages
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hw4: arrays, transition semantics, and guarded commands
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Answer

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1 Exercise 4.1

(1).
$$[i \in dom(X) \wedge j \in dom(X) \wedge (i \neq j \vee (i = j \wedge a = b))]$$

(2).
$$[i \in dom(X) \wedge j \in dom(X) \wedge X(i)+X(j) \in dom(X) \wedge X(i)+X(j) \neq i \wedge X(i)+X(j) \neq j]$$

2 Exercise 6.2(a)

- $$\frac{< c, \sigma > \longrightarrow < abort, \sigma' >}{< \textbf{repeat } c \textbf{ until } b, \sigma > \longrightarrow < abort, \sigma' >}$$

- $$\frac{< c, \sigma > \longrightarrow \sigma'}{< \textbf{repeat } c \textbf{ until } b, \sigma > \longrightarrow \sigma'} \quad when \ [[b]]_{boolexp}\sigma' = true$$

- $$\frac{< c, \sigma > \longrightarrow \sigma'}{< \textbf{repeat } c \textbf{ until } b, \sigma > \longrightarrow < \textbf{repeat } c \textbf{ until } b, \sigma' >} \quad when \ [[b]]_{boolexp}\sigma' = false$$

- $$\frac{< c, \sigma > \longrightarrow < c', \sigma' >}{< \textbf{repeat } c \textbf{ until } b, \sigma > \longrightarrow < c'; \textbf{ if } \neg b \textbf{ then repeat } c \textbf{ until } b, \sigma' >}$$

3 Exercise 7.2

$$[(x \geq 0 \vee \textbf{even } x) \wedge (x \geq 0 \Rightarrow y = 1) \wedge (\textbf{even } x \Rightarrow y = -1)]$$