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Problem 45
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A.

$\langle e, \rho_0, \sigma_0 \rangle \downarrow \langle v, \sigma_1 \rangle$

$$\frac{}{\langle VAL(x, e), \rho_0, \sigma_0 \rangle \downarrow \langle \rho_0\{x \rightarrow l\}, \sigma_1\{l \rightarrow v\} \rangle} \text{(DEFINEGLOBAL)}$$

B.

```
;; In uscheme this code creates a variable x with value #f, sets it to #t, and
;; the if statement evaluates to uscheme. In the new semantics, this code creates a
;; a variable x with value #f, creates a new and separate variable x with value #t, and the
;; if statement evaluates to new.
(val x #f)
(val x #t)
(if x 'uscheme 'new)
```

C.

I prefer the new design because a val binding should create a new variable and assign it the given value regardless of whether or not the variable already exists and what value the variable holds if it does exist.