ECS 140A Homework 6 – Problem 1

1 Prolog

Step 3: Working Code

```
my_last(X, [X]).
my_last(X, [_ | T]) := my_last(X, T).
```

Step 4: Debug Process

Bug 1

```
?- my_last(3, [1, 2, 3]).
false.
```

This behavior was a result of accidentally using `:=` instead of `:-`.

Fixed code:

```
my_last(X, [X]).
my_last(X, [_ | T]) :- my_last(X, T).
```

Results of given test cases:

```
?- my_last(3, [1, 2, 3]).
true .

?- my_last(1, []).
false.

?- my_last(X, []).
false.

?- my_last(X, [1, 2, 3]).
X = 3 .
```

Results of additional test cases:

```
?- my_last(1, [1]).
true .

?- my_last(1, [1, 1]).
true .

?- my_last(1, [2]).
false.

?- my_last(1, [2, 2]).
false.

?- my_last(3, [5, 10, 15, 20]).
false.

?- my_last(3, [3, 5, 10, 15, 20]).
false.

?- my_last(3, [5, 10, 3, 15, 20]).
false.

?- my_last(3, [5, 10, 3, 15, 20, 3]).
true .

?- my_last(X, [5]).
X = 5 .

?- my_last(X, [5, 10, 15, 20, 25, 30, 35, 40, 45, 50]).
X = 50 .

?- my_last(X, [5, [1]]).
X = [1] .

?- my_last(X, [5, abc]).
X = abc .
```

Step 5: Add Documentation

```
my_last(X, [X]). % single item left check
my_last(X, [_ | T]) :- my_last(X, T). % compare to tail of list
```

Step 6: Extra Test Cases Used

- `my_last(1, [1])`: true
- `my_last(1, [1, 1])`: true
- `my_last(1, [2])`: false
- `my_last(1, [2, 2])`: false
- `my_last(3, [5, 10, 15, 20])`: false
- `my_last(3, [3, 5, 10, 15, 20])`: false
- `my_last(3, [5, 10, 3, 15, 20])`: false
- `my_last(3, [5, 10, 3, 15, 20, 3])`: true
- `my_last(X, [5])`: X = 5
- `my_last(X, [5, 10, 15, 20, 25, 30, 35, 40, 45, 50])`: X = 50
- `my_last(X, [5, [1]])`: X = [1]
- `my_last(X, [5, abc])`: X = abc