1. Consider the algorithm Büchi-win in Figure 3.1 (Page 79) of the text. Design a game G for which Büchi-win makes at least 2 recursive calls.

2. Design a game G with $O(n)$ vertices for which Büchi-win makes at least n recursive calls.

3. Consider the following algorithm for a mixed Büchi and co-Büchi objective: two disjoint sets T and S are specified; Player 1 wins plays that visit T infinitely often and S only finitely often. Design an algorithm to compute winning regions of each player in this mixed objective game.

4. Consider the mixed Büchi and co-Büchi objective mentioned in the previous question.Give an example of a game graph on which the algorithm given below does not terminate.

```
1   algorithm  mixed-win(G)
2      if  reach₁(T) = V  and  S = ∅
3      then  (W₀, W₁) = (∅, V)
4      else
5          W₀′ = V \ reach₁(T)
6          G′ = V \ reach₀(W₀′)
7          (W₀″, W₁″) = mixed-win(G″)
8          (W₀, W₁) = (V \ W₁″, W₁″)
9      endif
10     return  (W₀, W₁)
```