1. Trace this Turing Machine on the tape shown below:

```
... # # # 0 1 0 1 0 0 1 1 0 1 1 1 # # # ...
```

2. What does this Turing Machine do in general?

3. Trace this Turing Machine on the tape shown below:

```
... # # # # # # 1 0 1 0 # # # # # # # # # ...
```

4. What does this Turing Machine do in general? (Assume starts on left most bit)
5. Complete the following TM so that it shifts the binary input right by one position. (E.g., if the TM starts with tape on the left, it should end with the tape on the right.) Assume the TM always starts on the leftmost nonempty (non-#) tape cell.

```
# 1 0 1 1 0 # #
```

6. Complete the following TM so that it accepts well-formed balanced parentheses expressions like ((())) or (((())) and rejects badly-formed ones like (()or ). Assume it starts on the left edge of the input. You may use the symbols: ), (, # and X. For example, see the starting tape on the left and ending tape on the right.

```
# # 1 0 1 1 0 #
```

```
# # # ( ) # # #
```

```
# # # X X # # #
```