Experiments and Data

The queue size was declared as 10. A circular queue that can hold a maximum of 10 characters in the kernel was created and attached to the device `/dev/my_char_device`.

1. **Load the device**
   ```
   cd patch
   bash loadDevice.sh
   ```

2. **Check the device queue state using procfs**
   ```
   cat /proc/my_char_device
   ```

   ```
   Output:
         -------------------
           Reads       : 0
           Writes      : 0
           Free Space  : 10
           Front       : 0
           Rear        : -1
         -------------------
   ```

3. **Run the tester program**
   ```
   cd ../user_process
   ./tester
   ```
   It gives options to insert and extract characters from the program.

4. **Insert 5 characters by giving the following input**

   ```
   -----------
       1
       abcde
   -----------
   ```

   5 characters have been written into the device.

5. **Check the queue state using**
   ```
   cat /proc/my_char_device
   ```

   ```
   It gave the following output
         -------------------
           Reads       : 0
           Writes      : 5
           Free Space  : 5
           Front       : 0
           Rear        : 4
         -------------------
   ```

6. **Extract 3 characters and check stats again**
   Give the following input to tester program

```
INPUT TO TESTER
-----------
    2 3
-----------

OUTPUT from TESTER
-------------
    a b c
-------------

Output of procfs
      -------------------
        Reads       : 3
        Writes      : 5
        Free Space  : 8
        Front       : 3
        Rear        : 4
      -------------------
```

7. **Try to write 9 more characters into the queue (only 8 free spaces are there now). Check state.**

```
 INPUT TO TESTER
-----------
    1
    fghijklmn
-----------

Output of procfs
      -------------------
        Reads       : 3
        Writes      : 13
        Free Space  : 0
        Front       : 3
        Rear        : 2
      -------------------
```

   We can see that only 8 more writes have taken place (5 - 13).

8. **Try to extract 11 characters from the queue (10 is the capacity). Check state.**

```
  INPUT TO TESTER
```

```
-----------
    2 11
-----------

OUTPUT from TESTER
-----------------------
  d e f g h i j k l m
  QUEUE EMPTY
-----------------------
```

We can see only 10 characters were extracted.

```
 Output of procfs
      -------------------
        Reads       : 13
        Writes      : 13
        Free Space  : 10
        Front       : 0
        Rear        : -1
      -------------------
```

9. **Unload the device**
   ```
   cd ../patch
   bash unloadDevice.sh
   ```