(a)

|  |  |
| --- | --- |
| Method | Input variable |
| public BoundedQueue(int capacity); | int capacity |
| public void enQueue(Object X); | Object X |
| public Object deQueue(); | state |
| public boolean isEmpty(); | state |
| public boolean isFull(); | state |

(b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Method | Input variable | Exception | CH ID | characteristics |
| public BoundedQueue(int capacity); | int capacity | IllegalArgumentException | C1 | Capacity > 0 |
| public void enQueue(Object X); | Object X | NullPointerException  IllegalStateException | C2  C3 | Add object  full |
| public Object deQueue(); | state | IllegalStateException | C4 | empty |
| public boolean isEmpty(); | state |  | C2 | empty |
| public boolean isFull(); | state |  | C3 | full |

(c)

|  |  |  |  |
| --- | --- | --- | --- |
| CH ID | characteristics | Partition | Base Block |
| C1 | Initialize queue | True , False | Initialize success |
| C2 | Add object | True , False | Not full |
| C3 | Full | True , False | True |
| C4 | empty | True , False | True |

(d)

|  |  |  |
| --- | --- | --- |
| CH ID | Partition | Block value |
| C1 | True  False | Capacity > 0  Capacity <0 |
| C2 | True  False | Not full  Full |
| C3 | True  False | full  Not full |
| C4 | True  False | Empty  Not empty |

(e)

|  |  |  |  |
| --- | --- | --- | --- |
| Method | characteristics | Test | oracles |
| public BoundedQueue(int capacity); | C1 | True  False | Queue capacity > 0  IllegalArgumentException |
| public boolean isEmpty(); | C1,C4 | TT  TF | Return true  Return false |
| public boolean isFull(); | C1,C3 | TT  TF | Return true  Return false |
| public Object deQueue(); | C1,C4 | TT  TF | IllegalStateException  Return 0 |
| public void enQueue(Object X); | C1,C2,C3 | TTT  TTF  TFT | IllegalStateException  size++  NullPointerException |