One user of the object:

object of class **UnboundedBuffer**

- `insert( ... )`
  - insert into data structure;

- `remove( ... )`
  - if (empty)
    - return failure;
  - else {
    - remove from data structure;
  }

Hidden implementation with invariant:

0 <= # elements stored in data structure

Several users of the object:

Monitor object of class **UnboundedBuffer**

- `synchronized insert( ... )`
  - insert into data structure;
  - notify();

- `synchronized remove( ... )`
  - if (empty)
    - wait();
  - remove from data structure;

Hidden implementation with invariant:

0 <= # elements stored in data structure
One user of the object:

object of class `BoundedBuffer`

```java
insert( ... )
```

if (full)
    return failure;
else {
    insert into data structure;
}

`Hidden implementation with invariant:

0 <= # elements stored in data structure <= MAX`

```java
remove( ... )
```

if (empty)
    return failure;
else {
    remove from data structure;
}

Several users of the object:

Monitor object of class `BoundedBuffer`

```
"synchronized" insert( ... )
```

if (full)
    nonfull.await();
insert into data structure;
nonempty.signal();

```
"synchronized" remove( ... )
```

if (empty)
    nonempty.await();
remove from data structure;
nonfull.signal();

`Hidden implementation with invariant:

0 <= # elements stored in data structure <= MAX`