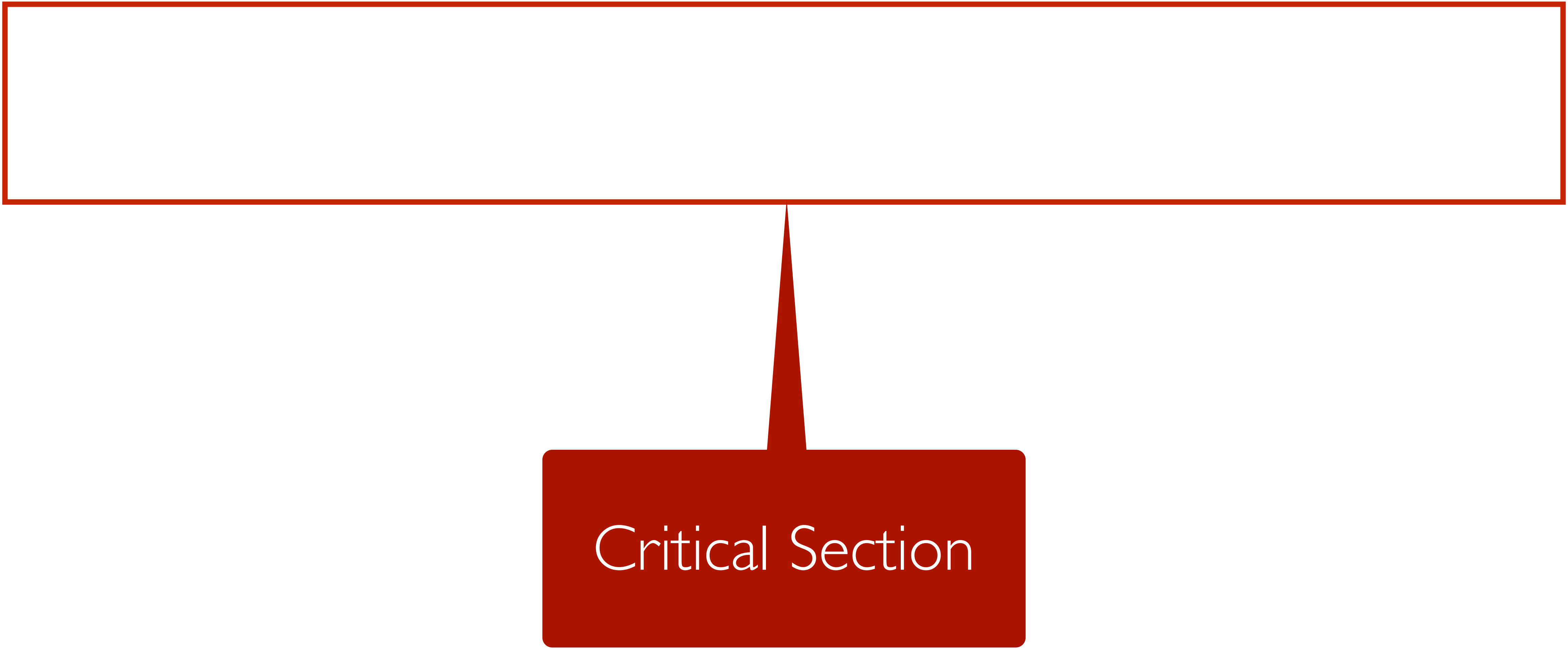
A classical example - Producer Consumer

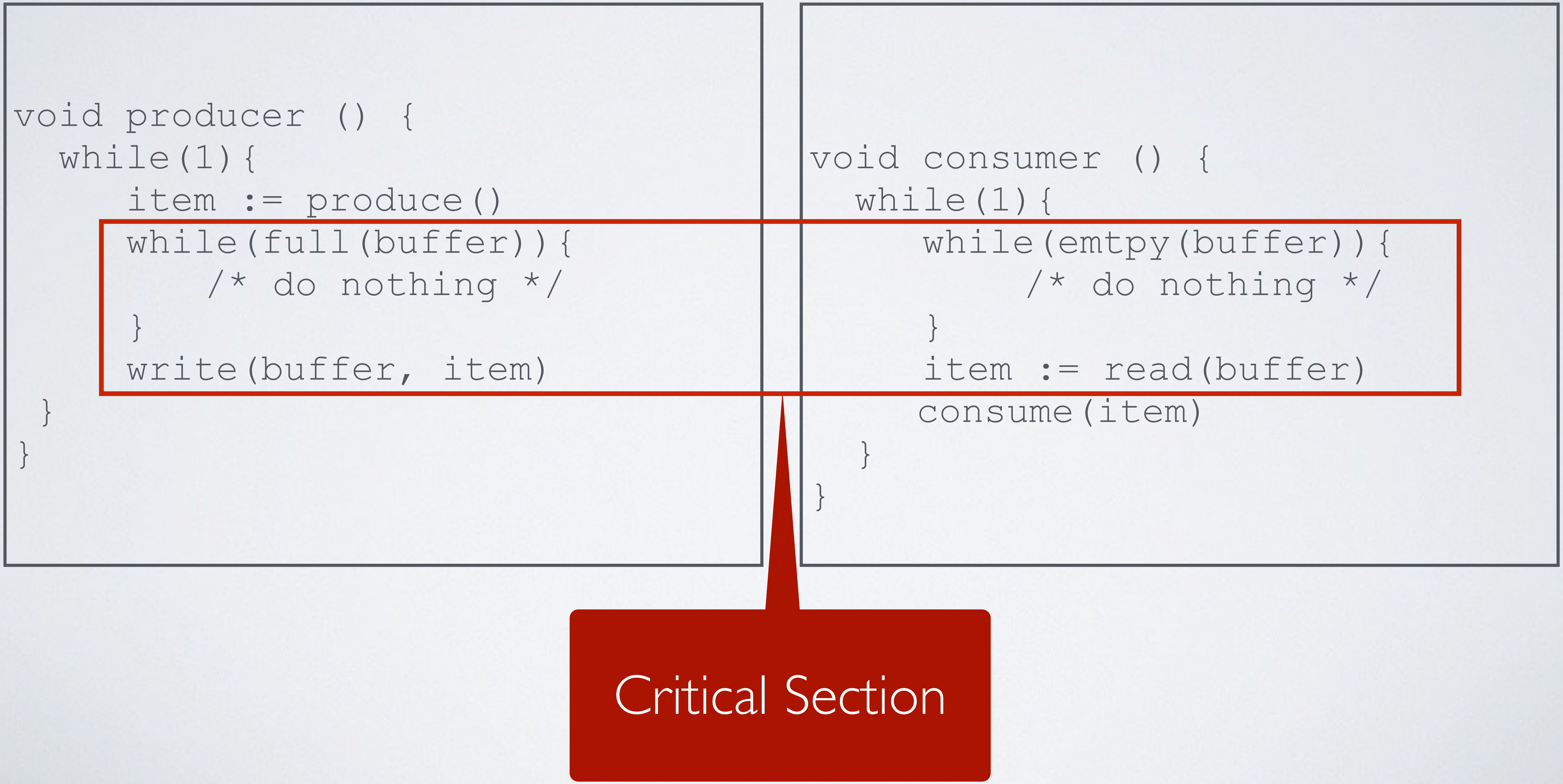
```
void producer () {
  while(1){
     item := produce()
     while(full(buffer)){
        /* do nothing */
     }
     write(buffer, item)
 }
}
```

```
void consumer () {
  while(1){
     while(emtpy(buffer)){
         /* do nothing */
     }
     item := read(buffer)
     consume(item)
  }
}
```



Critical Section

A classical example - Producer Consumer



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void consumer () {
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      while(emtpy(buffer)){
           /* do nothing */
      }
      item := read(buffer)
     consume(item)
   }
}
```

Critical Section

Requirements

1. **Mutual exclusion**
   If one thread is in the critical section, then no other is

➡ Mutual exclusion ensures ***safety property*** (nothing bad happen)

2. **Progress**
   If some thread T is not in the critical section, then T cannot prevent some other thread S from entering the critical section. A thread in the critical section will eventually leave it.

3. **Bounded waiting** (no starvation)
   If some thread T is waiting on the critical section, then T will eventually enter the critical section

➡ Progress and bounded waiting ensures the ***liveness property*** (something good happen)

4. **Performance**
   The overhead of entering and exiting the critical section is small with respect to the work being done within it