



United International University

Name
(Optional)

ID No.

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Section

Course Code

Trimester / Semester: Spring / Summer / Fall, 20.....

Date:

Name of Exam: Class Test / Mid-term / Mid-term (Makeup/Improvement) / Final / Final (Makeup/Improvement)

Bus - Passenger Problem

mutex m

condvar cv-bus-arrived, cv-passenger-boarded

int waiting_count = 0

bool bus_arrived = false

~~lock~~:

passenger - thread() {

lock(m);

waiting_count++;

while (!bus_arrived) {

wait(cv-bus-arrived), m);

}

board();

signal(cv-passenger-boarded);

unlock(m);

}

```
bus-thread( ) {  
    lock(m);  
    bus-arrived = true;  
    int n = min(waiting-count, k);  
    for int i=1 to n:  
        signal(cv-bus-arrived);  
        wait(cv-passenger-boarded, m);  
    waiting-count -= n;  
    bus-arrived = false;  
    unlock(m);  
}
```

Barber Shop Problem

mutex m

condvar cv-barber, cv-customer

int waiting-count = 0

~~bool barberbusy = false~~

Barber:

```
while(true) {  
    lock(m)
```

```
    if (waiting-count == 0):
```

```
        wait(cv-barber, m)
```

```
        signal(cv-customer)
```

~~```
 cutHair()
```~~

```
 unlock(m)
```

```
 cut Hair()
```

```
}
```

Customer:

```
lock(m)
```

```
if (waiting-count == N):
```

```
 unlock(m)
```

```
 leave() // this function does not
 return
```

```
waiting-count ++
```

```
signal(cv-barber, m)
```

```
wait(cv-customer, m)
```

```
getHairCut()
```

```
waiting-count --
```

```
unlock(m)
```