

**PSEUDOCODE:**

```

void *empresstravel(void *arg) {
    Mutex_lock(&m);
    while(days<=10) {
        empresslaunched = 1;
        if(days == empresssday) {
            printf("DAY %d: The empress arrived in Calicut \n", days);
            empresspresence = 1;
        }
        if(merchant arrived before ship && empress day today && empress did not go back {
            printf("DAY %d: The empress went back to the USA \n", days);
        }
        if(all merchants sold to empress && empress did not go back) {
            printf("DAY %d: The empress went back to the USA \n", days);
        }
        while (days == merchant 1 day) {
            Saw merchant 1 = 1;
            Cond_wait(empress);
            days++;
        }
        Cond_signal(merchant 1);
        if(saw merchant 1){
            days--;
            saw merchant 1=0;
        }

        while (days == merchant 2 day) {
            saw merchant 2 = 1;
            Cond_wait(empress);
            days++;
        }
        Cond_signal(merchant 2);

        if(saw merchant 2 == 1) {
            days--;
            sawmerchant2=0;
        }
        while (days == merchant 3 day) {
            saw merchant 3 = 1;
            Cond_wait(empress);
            days++;
        }
    }
}

```

```

    }
    Cond_signal(merchant);

    if(saw merchant 3 == 1){
        days--;
        saw merchant 3=0;
    }

    days++;
}
Mutex_unlock(&m);
}

void *merchanttravel1(void *arg) {

    Mutex_lock(&m);

    while (Not merchant 1 arrival day && empress still in USA) {
        Cond_wait(merchant 1);
    }

    if(empress is present == 1) {
        printf("DAY %d: The empress traded with one merchant ship (1) and the merchant ship
left \n", merchday1);
        all merchants passed check++;
    }

    else {
        printf("DAY %d: One merchant ship (1) traded with locals and left \n", merch day 1);
        merchant arrived before ship;
    }

    Cond_signal(empress);
    Mutex_unlock(&m);

    return NULL;
}

```

SAME FOR MERCHANT 2  
 SAME FOR MERCHANT 3

```
int main(int argc, char *argv[]) {
    char ch, input[4], buffer[4];
    int i=0, j=0;
```

Open file

Fill input array with values

```
    empressday = input[0];
    merchday1 = input[1];
    merchday2 = input[2];
    merchday3 = input[3];
```

```
    pthread_t merchant1, merchant2, merchant3, empress;
    Pthread_create( &empress, NULL, empresstravel, (void*)empressday);
    Pthread_create( &merchant1, NULL, merchanttravel1, (void*)merchday1);
    Pthread_create( &merchant2, NULL, merchanttravel2, (void*)merchday2);
    Pthread_create( &merchant3, NULL, merchanttravel3, (void*)merchday3);
```

```
    Pthread_join(merchant1, NULL);
    Pthread_join(merchant2, NULL);
    Pthread_join(merchant3, NULL);
    Pthread_join(empress, NULL);
```

```
}
```

### **Files outputs:**

#### **Input 1:**

DAY 5: One merchant ship (1) traded with locals and left  
 DAY 1: One merchant ship (2) traded with locals and left  
 DAY 6: The empress arrived in Calicut  
 DAY 6: The empress went back to the USA  
 DAY 7: One merchant ship (3) traded with locals and left

#### **Input 2:**

DAY 7: One merchant ship (1) traded with locals and left  
 DAY 6: The empress arrived in Calicut  
 DAY 6: The empress went back to the USA  
 DAY 6: One merchant ship (2) traded with locals and left  
 DAY 2: One merchant ship (3) traded with locals and left

Input 3:

DAY 2: One merchant ship (1) traded with locals and left

DAY 4: The empress arrived in Calicut

DAY 4: The empress went back to the USA

DAY 4: One merchant ship (2) traded with locals and left

DAY 9: One merchant ship (3) traded with locals and left

Input 4:

DAY 2: One merchant ship (1) traded with locals and left

DAY 3: The empress arrived in Calicut

DAY 3: The empress went back to the USA

DAY 4: One merchant ship (3) traded with locals and left

DAY 4: One merchant ship (2) traded with locals and left

Input 5:

DAY 4: The empress arrived in Calicut

DAY 9: The empress traded with one merchant ship (1) and the merchant ship left

DAY 6: The empress traded with one merchant ship (2) and the merchant ship left

DAY 7: The empress traded with one merchant ship (3) and the merchant ship left

DAY 10: The empress went back to the USA

Input 6:

DAY 6: One merchant ship (2) traded with locals and left

DAY 2: The empress arrived in Calicut

DAY 2: The empress went back to the USA

DAY 6: One merchant ship (3) traded with locals and left

DAY 1: One merchant ship (1) traded with locals and left

Input 7:

DAY 2: One merchant ship (1) traded with locals and left

DAY 3: One merchant ship (2) traded with locals and left

DAY 4: The empress arrived in Calicut

DAY 4: The empress went back to the USA

DAY 7: One merchant ship (3) traded with locals and left

Input 8:

DAY 1: The empress arrived in Calicut

DAY 8: The empress traded with one merchant ship (1) and the merchant ship left

DAY 1: The empress traded with one merchant ship (3) and the merchant ship left

DAY 9: The empress traded with one merchant ship (2) and the merchant ship left

DAY 10: The empress went back to the USA

Input 9:

DAY 3: One merchant ship (1) traded with locals and left

DAY 10: One merchant ship (2) traded with locals and left

DAY 7: The empress arrived in Calicut

DAY 7: The empress went back to the USA

DAY 5: One merchant ship (3) traded with locals and left

Input 10:

DAY 3: The empress arrived in Calicut

DAY 5: The empress traded with one merchant ship (1) and the merchant ship left

DAY 10: The empress traded with one merchant ship (2) and the merchant ship left

DAY 10: The empress traded with one merchant ship (3) and the merchant ship left

Input 11:

DAY 8: One merchant ship (1) traded with locals and left

DAY 5: The empress arrived in Calicut

DAY 5: The empress went back to the USA

DAY 10: One merchant ship (3) traded with locals and left

DAY 1: One merchant ship (2) traded with locals and left

Input 12:

DAY 7: One merchant ship (2) traded with locals and left

DAY 7: One merchant ship (1) traded with locals and left

DAY 9: One merchant ship (3) traded with locals and left

DAY 10: The empress arrived in Calicut

DAY 10: The empress went back to the USA

Input 13:

DAY 1: One merchant ship (1) traded with locals and left  
DAY 7: One merchant ship (2) traded with locals and left  
DAY 1: One merchant ship (3) traded with locals and left  
DAY 8: The empress arrived in Calicut  
DAY 8: The empress went back to the USA

Input 14:

DAY 7: One merchant ship (1) traded with locals and left  
DAY 6: The empress arrived in Calicut  
DAY 6: The empress went back to the USA  
DAY 3: One merchant ship (2) traded with locals and left  
DAY 7: One merchant ship (3) traded with locals and left

Input 15:

DAY 5: One merchant ship (1) traded with locals and left  
DAY 4: The empress arrived in Calicut  
DAY 4: The empress went back to the USA  
DAY 2: One merchant ship (2) traded with locals and left  
DAY 5: One merchant ship (3) traded with locals and left

Input 16:

DAY 10: One merchant ship (1) traded with locals and left  
DAY 5: The empress arrived in Calicut  
DAY 5: The empress went back to the USA  
DAY 9: One merchant ship (2) traded with locals and left  
DAY 2: One merchant ship (3) traded with locals and left

Input 17:

DAY 2: One merchant ship (1) traded with locals and left  
DAY 1: One merchant ship (2) traded with locals and left  
DAY 3: The empress arrived in Calicut  
DAY 3: The empress went back to the USA  
DAY 9: One merchant ship (3) traded with locals and left

Input 18:

DAY 1: One merchant ship (1) traded with locals and left  
DAY 5: One merchant ship (2) traded with locals and left  
DAY 10: The empress arrived in Calicut  
DAY 10: The empress went back to the USA  
DAY 10: One merchant ship (3) traded with locals and left

Input 19:

DAY 2: One merchant ship (1) traded with locals and left  
DAY 2: One merchant ship (3) traded with locals and left  
DAY 3: One merchant ship (2) traded with locals and left  
DAY 6: The empress arrived in Calicut  
DAY 6: The empress went back to the USA

Input 20:

DAY 5: One merchant ship (1) traded with locals and left  
DAY 9: One merchant ship (3) traded with locals and left  
DAY 8: The empress arrived in Calicut  
DAY 8: The empress went back to the USA  
DAY 2: One merchant ship (2) traded with locals and left