**PSEUDOCODE:**

void \*empresstravel(void \*arg) {

Mutex\_lock(&m);

while(days<=10) {

empresslaunched = 1;

if(days == empressday) {

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