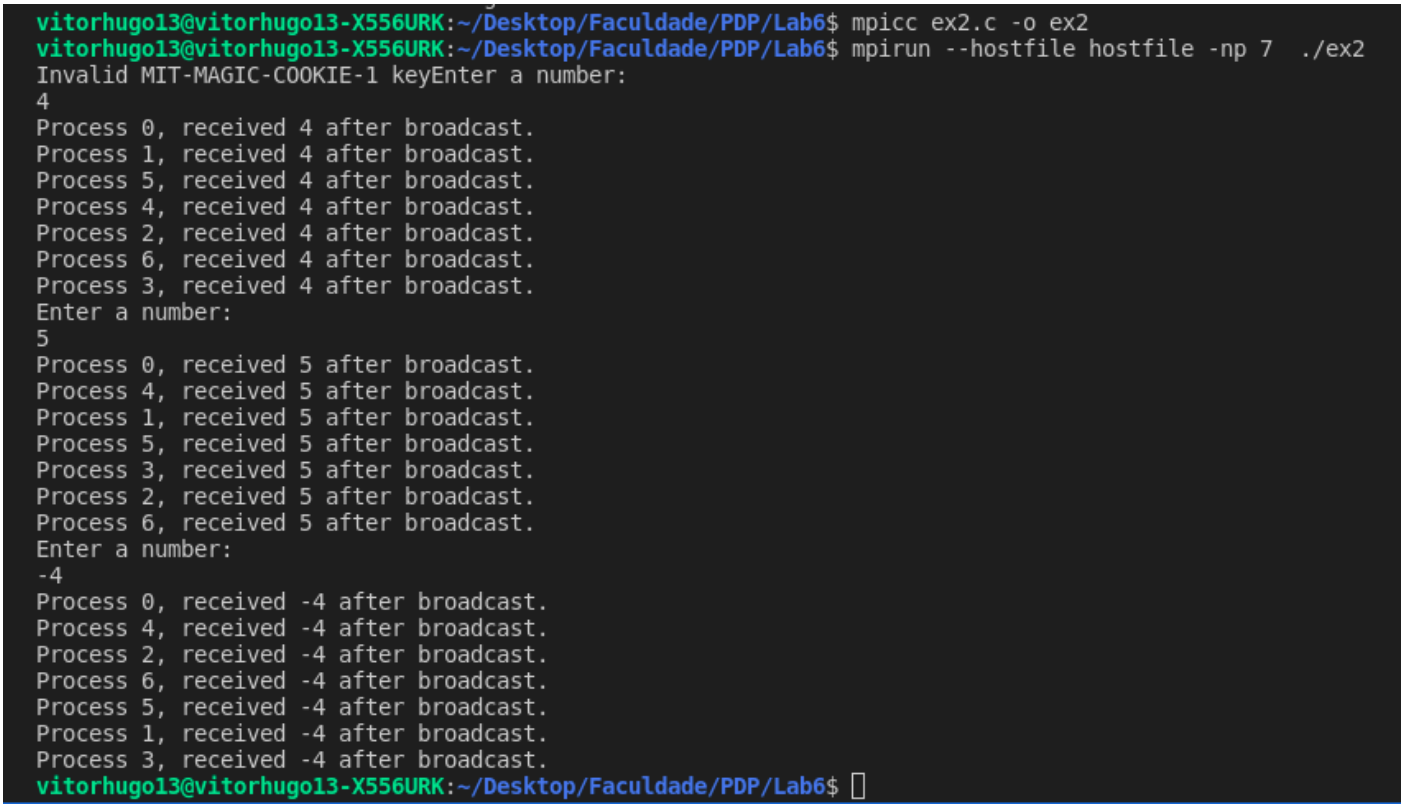
Lab 6

- As mentioned in the Lab5 report, I created an hostfile file indicating the number of slots to be available.

Question 2

The commands and outputs of the execution of programm 2 are illustrated in the following image.



Question 3

Three new elements added to the struct, as requested.

```c
typedef struct {
    char name[20];
    int age;
    char address[100];
    int id_number;
    char nationality[30];
} Data;
```

The commands and outputs of the execution of programm 3 are illustrated in the following image.

```
vitorhugo13@vitorhugo13-X556URK:~/Desktop/Faculdade/PDP/Lab6$ mpicc ex3.c -o ex3
vitorhugo13@vitorhugo13-X556URK:~/Desktop/Faculdade/PDP/Lab6$ mpirun --hostfile hostfile -np 7  ./ex3
Invalid MIT-MAGIC-COOKIE-1 key



In process 5 my name is Vitor Hugo and my age is 22, I live in Street Teatro Cubano et Banialuka, my id_number is 192837465 and I'm polish.
In process 1 my name is Vitor Hugo and my age is 22, I live in Street Teatro Cubano et Banialuka, my id_number is 192837465 and I'm polish.
In process 3 my name is Vitor Hugo and my age is 22, I live in Street Teatro Cubano et Banialuka, my id_number is 192837465 and I'm polish.
In process 4 my name is Vitor Hugo and my age is 22, I live in Street Teatro Cubano et Banialuka, my id_number is 192837465 and I'm polish.
In process 2 my name is Vitor Hugo and my age is 22, I live in Street Teatro Cubano et Banialuka, my id_number is 192837465 and I'm polish.
In process 6 my name is Vitor Hugo and my age is 22, I live in Street Teatro Cubano et Banialuka, my id_number is 192837465 and I'm polish.
In process 2 I have received name: Joao Pedro  and age: 14 and address: Street HukiMuki et La Bodega and id_number: 987654321 and nationality: 
MPI_Type_create_struct()
Total time for sending data: 0.000035s.
In process 4 I have received name: Joao Pedro  and age: 14 and address: Street HukiMuki et La Bodega and id_number: 987654321 and nationality: 
In process 6 I have received name: Joao Pedro  and age: 14 and address: Street HukiMuki et La Bodega and id_number: 987654321 and nationality: 
In process 3 I have received name: Joao Pedro  and age: 14 and address: Street HukiMuki et La Bodega and id_number: 987654321 and nationality: 
In process 5 I have received name: Joao Pedro  and age: 14 and address: Street HukiMuki et La Bodega and id_number: 987654321 and nationality: 
In process 1 I have received name: Joao Pedro  and age: 14 and address: Street HukiMuki et La Bodega and id_number: 987654321 and nationality: 
vitorhugo13@vitorhugo13-X556URK:~/Desktop/Faculdade/PDP/Lab6$
```

Time of execution: 0.000035s

Question 4

Since I wanted to compare times between both approaches, I tried to replicate the struct of the exercise 3, in the same way as in the provided code.

```
for (i=0; i<20; i++){
    name[i] =  (rand() % (121 - 97 + 1)) + 97;
}

age = 123;

for (i=0; i < 30; i++){
    address[i] = (rand() % (121 - 97 + 1)) + 97;
}

id_number = 123456789;

for (i=0; i < 30; i++){
    nationality[i] =  (rand() % (121 - 97 + 1)) + 97;
}
```

The commands and outputs of the execution of programm 4 are illustrated in the following image.

```
vitorhugo13@vitorhugo13-X556URK:~/Desktop/Faculdade/PDP/Lab6$ mpicc ex4.c -o ex4
ex4.c: In function ‘main’:
ex4.c:35:25: warning: implicit declaration of function ‘rand’ [-Wimplicit-function-declaration]
   35 |             name[i] =  (rand() % (121 - 97 + 1)) + 97;
      |                         ^~~~
vitorhugo13@vitorhugo13-X556URK:~/Desktop/Faculdade/PDP/Lab6$ mpirun --hostfile hostfile -np 2  ./ex4
Invalid MIT-MAGIC-COOKIE-1 key

name[0] = i...name[19] = l
age=123
address[0] = l...address[29] = u
id_number=123456789
nationality[0] = n...nationality[29] = a
Total time for sending data: 0.000008s.

vitorhugo13@vitorhugo13-X556URK:~/Desktop/Faculdade/PDP/Lab6$
```

Time of execution: 0.000008s

Conclusion

Comparing both execution times, we can say that for this type of data, Pack approach would result in better times. However, we should be aware that in exercise 4 we are only sending information once. That being sad, since in exercise 3 we are sending multiple times, for an unique send it would be faster.