Assigment 4

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January 2020

Contents

1 Introduction

We use MPI library for c to calculate π using numerical formula

$$\pi = \sum_{i=0}^{\infty} \frac{(i!)^2 2^{i+1}}{(2i+1)!}$$

MPI is used in distributed systems to communicate with each other. No need for shared memory but they use message between the system.

2 Process and Communication

I divide my process into one master process that collect the data and several process each one calculate his iteration then send the result into master node (see figure 1).

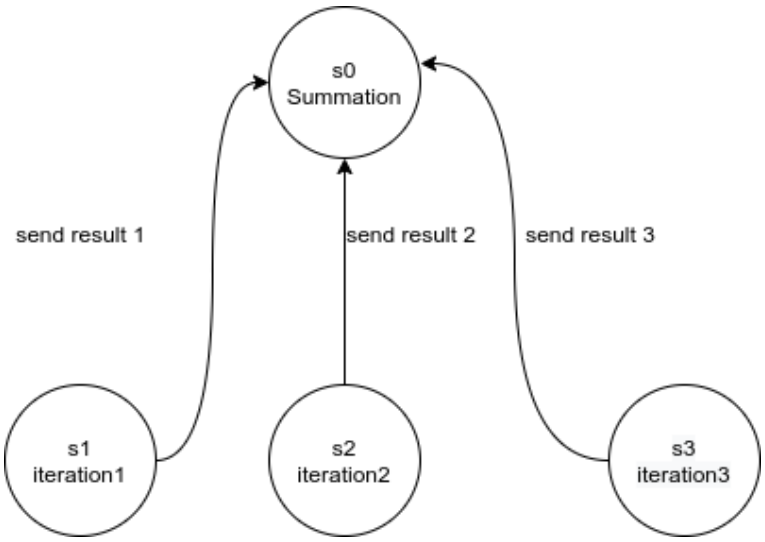

Figure 1: Communication between nodes

but we firstly get input from the user about the limit of i in the equation. we can get input from the user from process 0 only ($s0$) so we should recive it to each process (see figure 4)

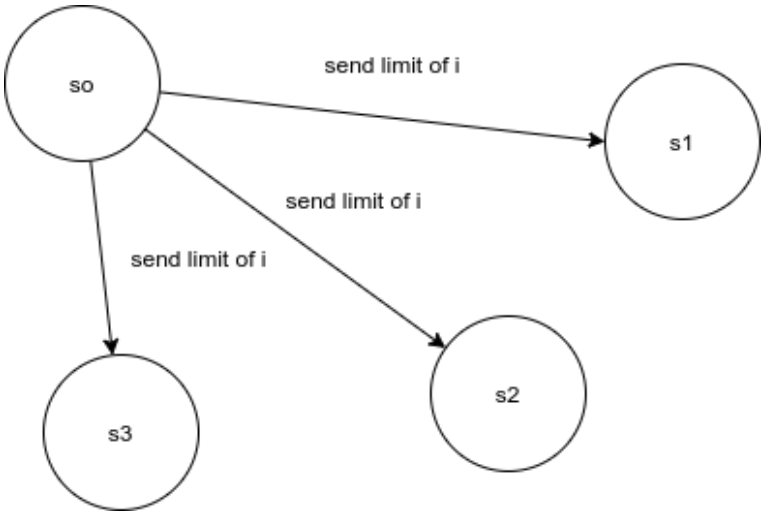

Figure 2: processes receive the limit of i

3 Result

```
Please Enter i(0 -> 90):
80
PI = 3.14159265358979222782
time: 0.000216000
```

Figure 3: result of pi without using mpi

```
Please Enter i(0 -> 90):
80
time using MPI: 0.000003192
PI = 3.14159265358979178373
```

Figure 4: result of pi using mpi

program that run using mpi is faster than the other program by %77.