Homework 04

15.1

1. 进程0将起始于msg1的count1个int型数据，附于tag1发送给通信域comm1的进程1，进程1也从通信域的进程0中接收到了对应的消息缓冲。通过通信，这两个进程完成了快速傅里叶并行变换，
2. 没有通信体则不能区分comm1和comm2中的1号进程，此时msg1和msg2中的消息将会相互干扰，影响通信。

15.3

```
float data[1024], buff[10];
for(int i = 0; i < 10; i++) buff[i] = data[32*i];
MPI_Send(buff, 10, MPI_FLOAT, dest, tag, MPI_COMM_WORLD);
```

15.13

buffon针代码如下：

```
#include <iostream>
#include <ctime>
#include <cmath>
using namespace std;
double buffon(int l, int a, int b, int n){
    clock_t start, end;
    start = clock();
    int hit = 0;
    for (int i = 0; i < n; i++){
        // rand base
        double base_x = a * (double)rand() / (double)(RAND_MAX);
        double base_y = b * (double)rand() / (double)(RAND_MAX);
        // rand pin
        double cita = (double)rand();
        double pin_x = base_x + l * cos(cita);
        double pin_y = base_y + l * sin(cita);
        if(pin_x <= 0 || pin_x >= a || pin_y <= 0 || pin_y >= b){
            hit++;
        }
    }
    end = clock();
    cout << "Simulation time is: " << end - start << "ms" << endl;
    return (double)hit / (double)n;
}
int main(){
    int l, a, b, n;
    cin >> n >> a >> b >> l;
    double pos = buffon(l, a, b, n);
    double pi = (double)(2 * l * (a + b) - l * l) / (pos * a * b);
    cout << "The result of PI is : " << pi << endl;
    return 0;
}
```

输入如下：

```
1000000
5
5
3
```

结果如下：

```
Simulation time is: 113ms
The result of PI is : 3.1413
```

可以看出，当模拟1000000次、针长为3，a为5，b为5时，模拟时间为113ms，精度为小数点后3位.