

# 2019 Fall Introduction to Operating Systems

Homework 4

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## 1 hw4\_Series

### 1.1 Counting the Numbers Locally

```
for (LL i = L; i < R; i ++) {  
    LL num = (int)(input[i] - '0');  
    _cnt[num] ++;  
}
```

### 1.2 Adding the Count into Global Variable

```
for (LL i = 0; i < 10; i ++) {  
    sem_wait(&sem[i]);  
    cnt[i] += _cnt[i];  
    sem_post(&sem[i]);  
}
```

## 1.3 The Results

```
tzuli110@linux1:~/Work/2019-OS/HW4$ ./compile hw4_Series.c
tzuli110@linux1:~/Work/2019-OS/HW4$ ./run 1-1.in
0616015
The total number of 0 : 10001482
The total number of 1 : 9999006
The total number of 2 : 10005500
The total number of 3 : 10002851
The total number of 4 : 10002475
The total number of 5 : 9997938
The total number of 6 : 9994655
The total number of 7 : 10001291
The total number of 8 : 9996888
The total number of 9 : 9997914
real    0m0.252s
user    0m0.171s
sys     0m0.077s
tzuli110@linux1:~/Work/2019-OS/HW4$ ./run 1-2.in
0616015
The total number of 0 : 10001482
The total number of 1 : 9999006
The total number of 2 : 10005500
The total number of 3 : 10002851
The total number of 4 : 10002475
The total number of 5 : 9997938
The total number of 6 : 9994655
The total number of 7 : 10001291
The total number of 8 : 9996888
The total number of 9 : 9997914
real    0m0.215s
user    0m0.174s
sys     0m0.082s
```

## 2 hw4\_Pi

### 2.1 Sample Points

```
LL _sample = n / k;
while (_sample --) {
    rand_x = (double)(rand_r(&seed) % (INTERVAL + 1)) / INTERVAL;
    rand_y = (double)(rand_r(&seed) % (INTERVAL + 1)) / INTERVAL;
    if (rand_x * rand_x + rand_y * rand_y < 1)
        _cnt ++;
}
```

## 2.2 Adding into the Global Variable

```
sem_wait(&sem);  
total += _cnt;  
sem_post(&sem);
```

## 2.3 The Results

```
tzuli110@linux1:~/Work/2019-OS/HW4$ ./compile hw4_Pi.c  
tzuli110@linux1:~/Work/2019-OS/HW4$ ./run 2-1.in  
0616015  
Thread 0, There are 78541776 points in the circle  
Pi : 3.141671  
  
real    0m1.136s  
user    0m1.127s  
sys     0m0.004s  
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tzuli110@linux1:~/Work/2019-OS/HW4$ ./run 2-4.in  
0616015  
Thread 0, There are 19635746 points in the circle  
Thread 1, There are 19634582 points in the circle  
Thread 2, There are 19633915 points in the circle  
Thread 3, There are 19637558 points in the circle  
Pi : 3.141672  
  
real    0m0.449s  
user    0m1.172s  
sys     0m0.005s
```