Introduction to Programming Laboratory

Lab3 - pthread

2017/7/6

Outline

- Compile and execute pthread program on the platform
- Mutex
- Condition variable

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Lab3-1 Compile and run Pthread program

Login to server and copy lab3 directory to your home directory

- cp -r /home/ipl2017/shared/lab3 . && cd lab3

[Compile]

```
gcc HelloWorld_pthread.c -o HelloWorld_pthread -lpthread
```

[Edit job script]

```
#PBS -l nodes=1:ppn=1
```

[Run]

```
qsub job.sh
```

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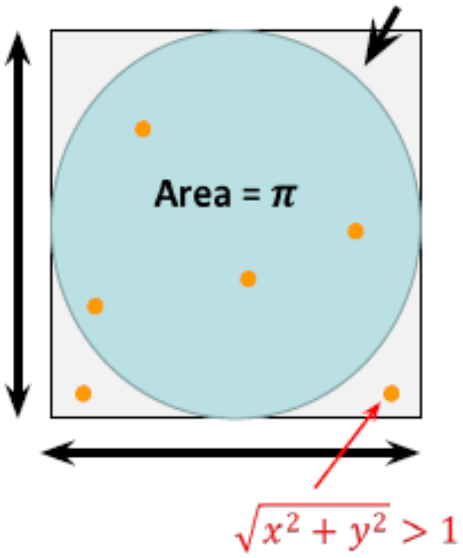
Lab3-2 Calculate the value of π using Pthread

Monte Carlo Methods : A class of computational algorithms that rely on repeated random sampling to compute their results.

- How to use it to compute **π** ?
  - We know: $\frac{Area\ of\ circle}{Area\ of\ square} = \frac{\pi}{4}$
  - Randomly choose points from the square
  - Giving sufficient number of samples, the fraction of the circle will be $\frac{\pi}{4}$
  - $\pi = 4 * \frac{\text{number of points in circle}}{\text{number of points in square}}$



Lab3-2 Calculate the value of π using Pthread

Pthread version

[Compile]

```
gcc pi_pthread.c -o pi_pthread -lpthread
```

[Edit job script] vim job.sh:

```
#PBS -q debug
#PBS -l nodes=1:ppn=1
./pi 500000
```

[Run]

```
qsub job.sh
```

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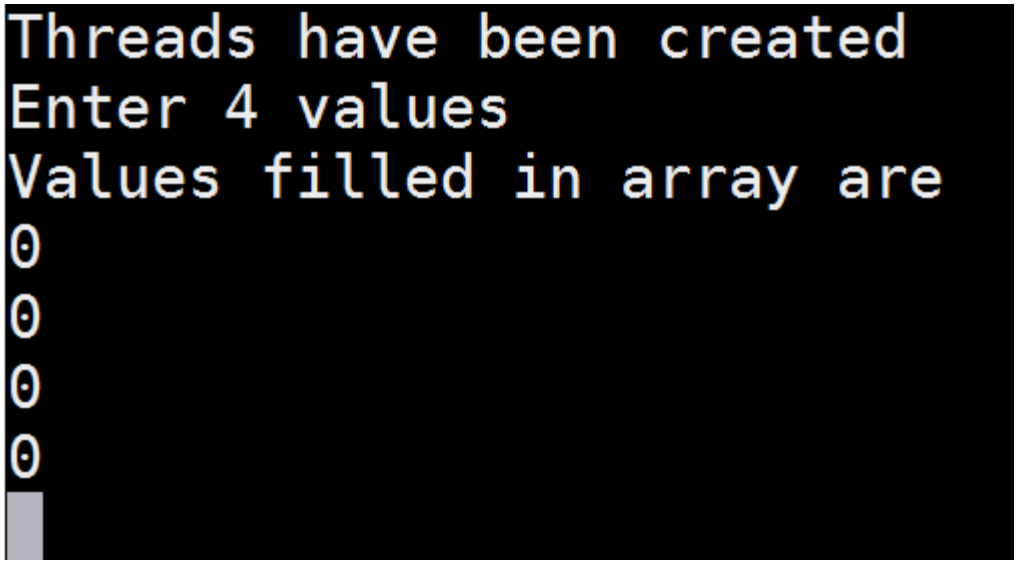
Lab3-3 Condition variable

Compile and execute pthread_cond.c under lab3 directory, you should see result like below:



Modify the program with **condition variable** so that it will wait until you finished entering 4 values, then print the values filled in array !