Project 5
Concurrency Programming

Overview

- Learning concurrency programming
- No relationship with previous projects
- Based on BACI, a simplified C++ language

BACI

- http://www.mines.edu/fs_home/tcamp/baci/
- Teaching language
- A simplified version of C++, plus some concurrency construct
- Steps to write BACI program
  - Write your source code in *.cm
  - Compile it to P-Code (bacc)
  - Interpret and run the P-Code (bainterp)

Simple Sample

```
void print_number(int i)
{
    cout<<i<<endl;
}
main()
{
    cobegin
    {
        print_number(1); print_number(2); print_number(3);
    }
}
```

Semaphore

- Semaphore
  - semaphore s = 17;
  - p(s);
  - v(s);
- Binary semaphore
  - binarysem b = 0;
  - p(b);
  - v(b);

BACI

- Baci executables
  - DOS (Windows)
  - Linux
  - Sun OS (installed on olympus, path is /export/home/c/cop46001/basunxe)
- You can
  - Install a copy of BACI and work on your computer
  - Use BACI on olympus (add /export/home/c/cop46001/basunxe to your PATH)

Producer and Consumer

- A bounded buffer
  - Size of 20
- Producer put multiple items
  - produce one by one, once an item has been produced, it is available to consumer immediately
- Consumer take 1 item a time
- If buffer is full, producer wait
- If buffer is empty, consumer wait
- First In, First Out
- You will need to test 1 producer, multiple consumers

Producer and Consumer

- void producer(int NullLoop, int NumberOfItems)

```
{
        ……
        for (i=0;i<NullLoop;i++) {}
        ……
        // produce items one by one
        // for every item produced, print it out
        // cout << "producer enter a new item " << total << ", value: " << value << endl;
          ….
}
```

- void consumer(int NullLoop, int ConsumerID)

```
{
        ……
        for (i=0;i<NullLoop;i++) {}
        cout << "consumer " << ConsumerID << " remove an item " << value << endl;
        ……
}
```

Test cases

- Consumer wait for producer
  - consumer(0, 1); consumer(0, 2); producer(1000, 2);
- Producer wait for consumer
  - producer(0, 21); consumer(100, 1); consumer(100, 2);

Submission

- Submit on olympus
  - If you work on your own computer, upload it to olympus
  - You will need new Makefile
  - cp /export/home/e/emontagn/project/Makefile3 Makefile
  - make submitcc
- Due date:
  - Nov 26 (Monday) midnight