

# Concurrency Theory, Assignment Lecture 5

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The following PGLEcw program **Add** computes  $x1 + x2$ . It increments  $c1$  and decrements  $c2$  until  $c2$  becomes zero.

```
- smnnc:c2.isZero {*;
    smnnc:c1.succ;
    smnnc:c2.pred;
*};
```

The following PGLEcw program **InitAdd** initializes the counters to  $c1 = 2, c2 = 3$ .

```
smnnc:c1.succ;
smnnc:c1.succ;
smnnc:c2.succ;
smnnc:c2.succ;
smnnc:c2.succ;
```

The following PGLEcw program **MultAdd** computes  $x1 + x2 * x3$ . It adds  $c2$  to  $c1$   $c3$  times. Since the addition destructs the input value of  $c2$ , it is stored in  $t2$  and restored afterwards.

```
- smnnc:c3.isZero {*;
    - smnnc:t2.isZero {*;
        smnnc:t2.pred;
    *};
    - smnnc:c2.isZero {*;
        smnnc:c1.succ;
        smnnc:t2.succ;
        smnnc:c2.pred;
    *};
    - smnnc:t2.isZero {*;
        smnnc:c2.succ;
        smnnc:t2.pred;
    *};
    smnnc:c3.pred;
*};
```

The following PGLEcw program **XXaXa1** computes  $x1^2 + x1 + 1$ . It copies  $c1$  to  $c2$  and  $c3$ , executes **MultAdd** and increments the result.

```
- smnnc:t1.isZero {*;
    smnnc:t1.pred;
*};
```

```

- smnnc:c2.isZero {*;
    smnnc:c2.pred;
*};
- smnnc:c3.isZero {*;
    smnnc:c3.pred;
*};
- smnnc:c1.isZero {*;
    smnnc:t1.succ;
    smnnc:c2.succ;
    smnnc:c3.succ;
    smnnc:c1.pred;
*};
- smnnc:t1.isZero {*;
    smnnc:c1.succ;
    smnnc:t1.pred;
*};
- smnnc:c3.isZero {*;
    - smnnc:t2.isZero {*;
        smnnc:t2.pred;
    *};
    - smnnc:c2.isZero {*;
        smnnc:c1.succ;
        smnnc:t2.succ;
        smnnc:c2.pred;
    *};
    - smnnc:t2.isZero {*;
        smnnc:c2.succ;
        smnnc:t2.pred;
    *};
    smnnc:c3.pred;
*};
smnnc:c1.succ;

```

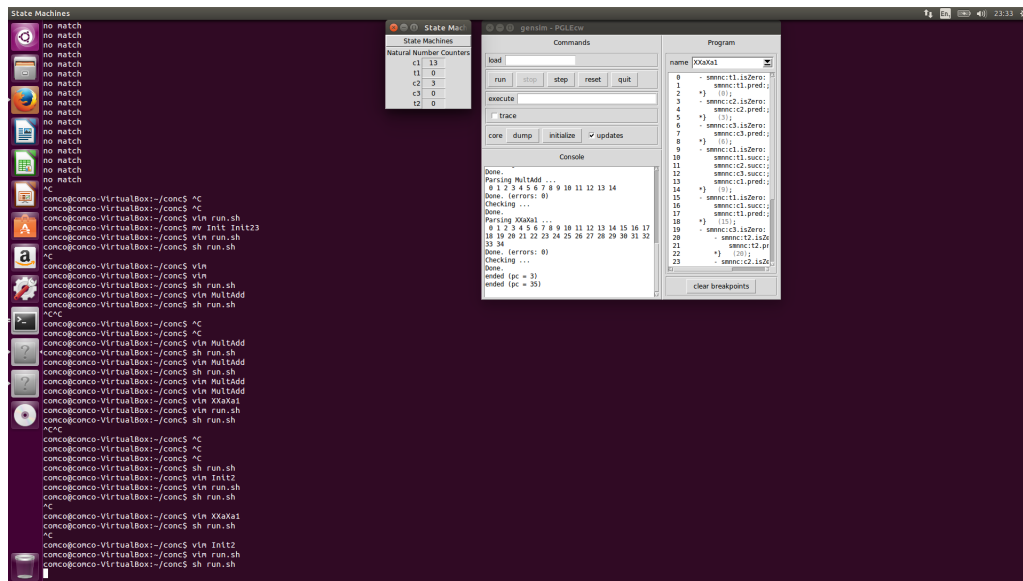
The following PGLEcw program `InitXXaXa1` initializes  $c1 = 3$ .

```

smnnc:c1.succ;
smnnc:c1.succ;
smnnc:c1.succ;

```

The following is a screenshot of the simulator running `XXaXa1` after `InitXXaXa1`.



The programs are run using the following command:

```
#!/bin/sh
gensim -v -g -P PGLEcw -B FMN \
  -l InitAdd -l Add \
  -l InitXXaXa1 -l XXaXa1
```

The source code of this assignment can be found on GitHub.