

SE Assignment 4

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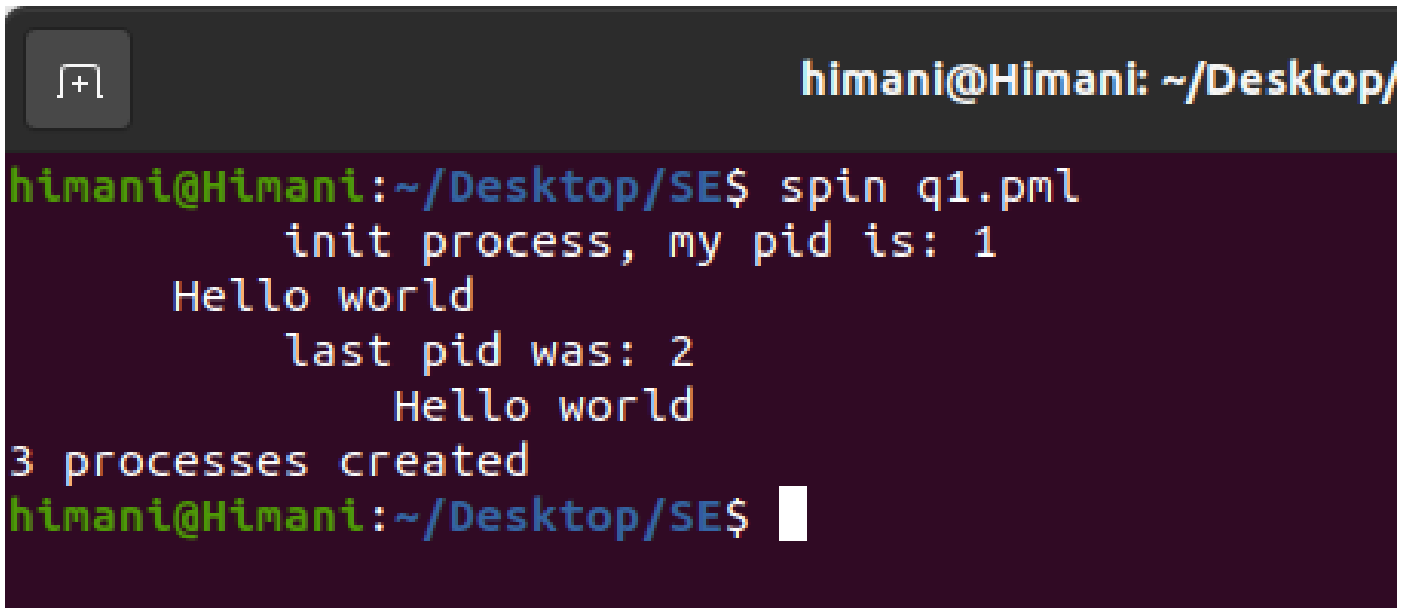
Based on Spin/ Promela

1. Write a program to create a process that prints "Hello World". Use run in init process to instantiate it and _pid to print the ids of all create processes.

Source Code:

```
active proctype Hello(){
    printf("Hello world\n")
}
init{
    int lastpid;
    printf("init process, my pid is: %d\n",_pid);
    lastpid = run Hello();
    printf("last pid was: %d\n", lastpid);
}
```

Output:



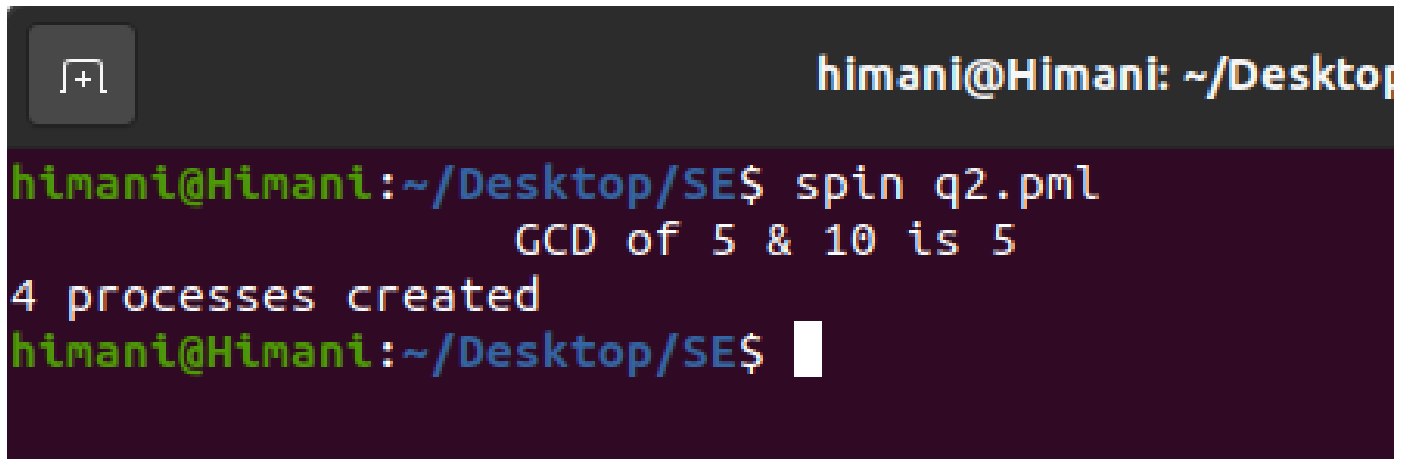
```
himani@Himani: ~/Desktop/
himani@Himani:~/Desktop/SE$ spin q1.pml
    init process, my pid is: 1
    Hello world
    last pid was: 2
    Hello world
3 processes created
himani@Himani:~/Desktop/SE$
```

2. Model Euclid's algorithm for Greatest Common Divisor.

Source Code:

```
proctype gcd(int a; int b){
    if
        :: (b == 0) -> printf("GCD of 5 & 10 is %d\n", a)
        :: (b != 0) -> run gcd(b, a%b)
    fi
}
init{
    run gcd(5,10);
}
```

Output:



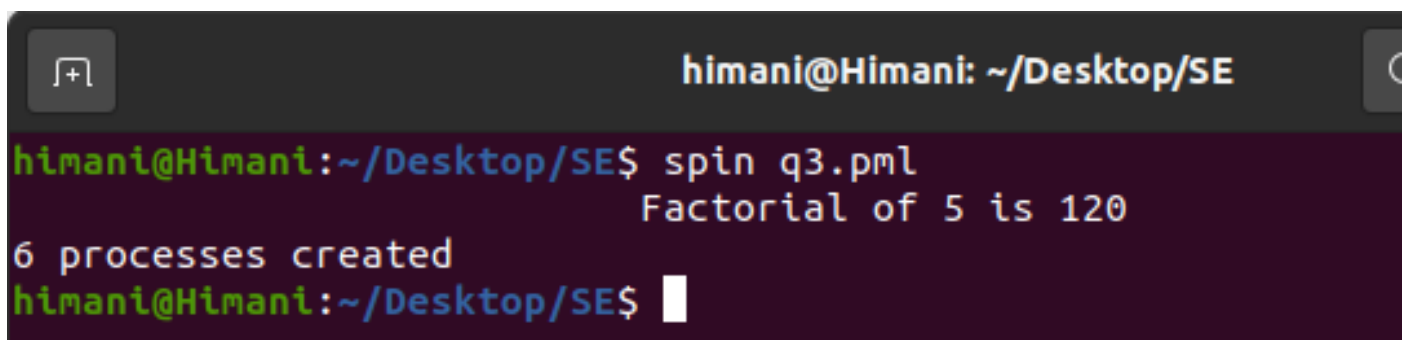
```
himani@Himani: ~/Desktop
himani@Himani:~/Desktop/SE$ spin q2.pml
GCD of 5 & 10 is 5
4 processes created
himani@Himani:~/Desktop/SE$
```

3. Create a process factorial(n, c) that recursively computes the factorial of a given non-negative integer “n”.

Source Code:

```
int res =1;
proctype fac(int n){
    if
        :: (n == 1) -> printf(" Factorial of 5 is %d\n",res)
        :: (n >= 2) -> res = res *n; run fac(n-1)
    fi
}
init{
    run fac(5);
}
```

Output:



```
himani@Himani: ~/Desktop/SE
himani@Himani:~/Desktop/SE$ spin q3.pml
Factorial of 5 is 120
6 processes created
himani@Himani:~/Desktop/SE$
```

4. Create a Promela model for producer-consumer problem with buffer size 5.

Source Code:

```
mtype = { P, C }; /* define 2 symbolic values: P and C */
mtype turn = P; /* global variable */
active proctype producer(){
    do /* loop */
        :: (turn == P) -> /* guard of the case */
            printf("Produce\n");
            turn = C
    od
```

```
}
active proctype consumer(){
    do
        :: (turn == C) ->
            printf("Consume\n");
            turn = P
    od
}
```

Output:

[illegible]