Computation structures

Problem-solving lesson 5

Exercises

1. How many processes are created by the following programs?

   (a)
   ```
   void main() {
       fork();
       fork();
       fork();
   }
   ```

   (b)
   ```
   void main() {
     for (int i = 0; i < 11; i++)
       fork();
   }
   ```

2. A producer process writes integer numbers into a buffer zone with N slots in such a way that three consumer processes (C1, C2 and C3) can read them. The consumers must access the buffer zone one at a time in an orderly fashion: C1, then c2, then C3, then C1 ans so forth. Each element in the buffer will be read by one and only one consumer. Use the C language to implement the code of the consumer processes and the producer process.

3. A producer process $P1$, two modifier processes $M1$ and $M2$ and a consumer process $C1$ share a buffer of K slots. $P1$ writes integer numbers into the buffer. Each number is firstly read and modified by $M1$, then read and modified by $M2$. Once these two modifications happened, the result is consumed by $C1$ and the corresponding slot in the buffer is freed. Use the C language to implement the code of the producer process, the modifier processes and the consumer process.

Use the factious keyword `shared` in the same manner as `volatile` and the factious type `semaphore` handled by the `wait` and `signal` functions.