Master Program in Computer Science and Networking

High Performance Computing

2012-13

Homework 2

Submit the written answer. Deadline: lecture of October 1, or send an e-mail: vannesch@di.unipi.it. The solution has to be discussed at Question Time.

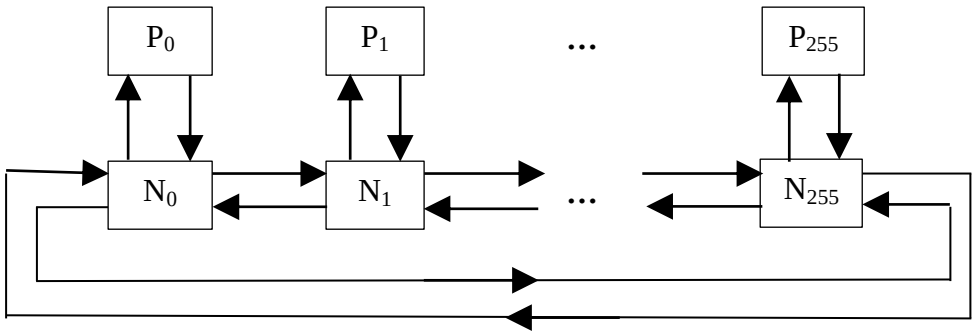
Question 1

a) Some locations in the Virtual Memory of a process are initialized at compile time, while other locations are left unspecified by the compiler. Explain notable examples of initialized and non-initialized information. If a data structure is not initialized, why is it allocated in the Virtual Memory?

b) Let S be a data structure which is shared by some processes. Explain whether the following sentence is true or false or true on some conditions: "each time a process Q modifies S, the modification must be done also in the Virtual Memory of Q and in the Virtual Memories of all the other processes sharing S".

Question 2

The following parallel computation is expressed in LC:



The set N_0, …, N_{255} of "ring" processes emulates a *double-ring network*, through which "user" processes P_0, …, P_{255} exchange messages of integer type. When a user process wants to send an integer *V* to another user process, it sends the triple *(V, source identifier, destination identifier)* to the associated ring process, which sends the triple through the ring considered the "best" one for minimizing the communication latency. When a ring process receives a triple, if the destination position contains its name then it sends the pair *(V, source identifier)* to the associated user process, otherwise it propagates the triple through the same ring.

Write and explain the generic N_j.