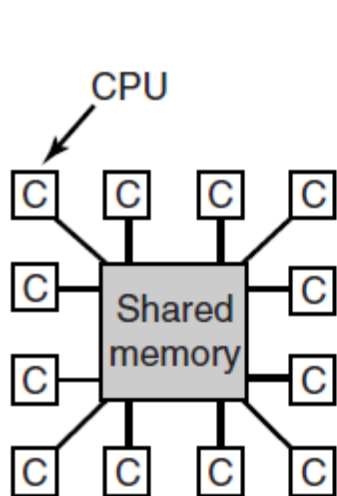


Multiprocessor and Distributed Computing

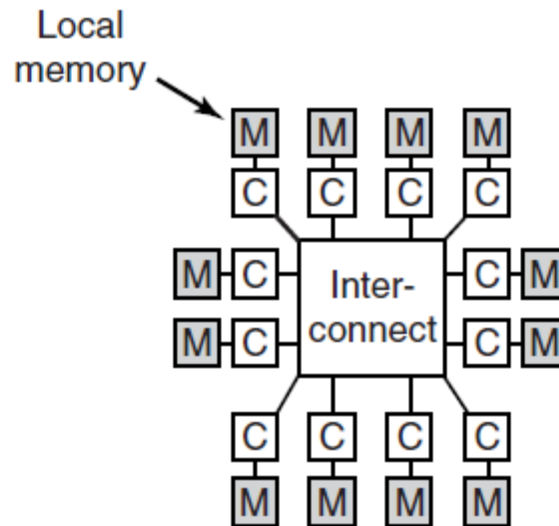
Week 13 - Lab 13

<https://goo.gl/LnvlL3>

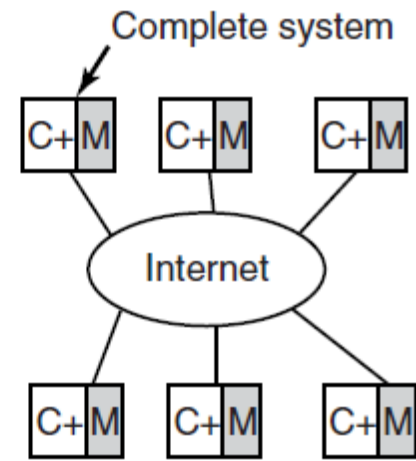
Multiple Processor Systems



(a)



(b)



(c)

- (a) A shared-memory multiprocessor.
- (b) A message-passing multicomputer.
- (c) A wide area distributed system

Get CPU Info

- *To get info about CPU use next command
\$ less /proc/cpuinfo*
- *Also you can use \$ lscpu*

Exercise 1

- How many CPUs does your VM have? How many CPU cores are provided?

Exercise 2

- Copying buffers takes time. Write a C program `ex2.c` to find out how much time it takes on a system to which you have access. Use the *clock* or *times* functions to determine how long it takes to copy a **LARGE** array.

Multicore Machines

- Running one process on a multicore machine and using the only core is not efficient. As long as you have multicore VM, you can increase productivity of your code and decrease used time.

Exercise 3

- Write a C program `ex3.c` that would calculate the quantity of prime numbers that are not greater than 100000 and show how long it took to do it. Program should show how long it takes to calculate it using 1 CPU? Try to do the same task 2 and 3 times in parallel. Explain the results.
- Hint: use *`fork()`*, *`waitpid()`*, *`time()`*

Exercise 3

- The output should look like that:

Calculated «PRIMES_NUMBER» primes.

Calculated «PRIMES_NUMBER» primes.

...

Calculated «PRIMES_NUMBER» primes.

This machine calculated all prime numbers under «MAX_PRIME»
«NUMBER_OF_TIMES» times in «SECONDS_NUMBER» seconds

«NUMBER_OF_TIMES» is the same to amount of the next string «Calculated
«PRIMES_NUMBER» primes.»

Exercise 4

- What happens if three CPUs in a multiprocessor attempt to access exactly the same word of memory at exactly the same instant? Write your answer to file ex4.txt.