Multiprocessing & Threads

Each computer is running ~40 programs, but they have 1 CPU. So how do they run more than 1 process?
pc

address of the next instr to run

Return stack

info about function calls

16 regs

Time-sharing
Context Switch
Process Switch

Dual core 2
Quad core 4 CPUs
Asynchronously

Async I/O — we issue the request. Go ahead & do something else.
Process Switches are slow (5-6 ms per)

Calculation process

GUI process

Threads (lightweight process)
Typically 2 processes have 2 different memory spaces.

However 2 threads share the same memory (a few users).
Continuation

all the info needed

to continue on w/a

process.
Problems with Concurrency

George's Bank
Account $100

A. George pays Matt $50
   (For a good grade)

B. Krista pays $50 for a copy
   or A1
1. ATM 1

gets G's balance +100

- 50

so

so

same to G's balance

K 1CHZ

ATM 2

gets G's balance of $100

+ 50

150

same to G's balance