Lecture 02: The Bigger Picture

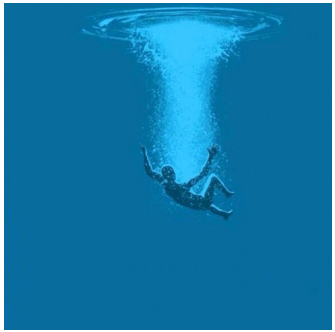
CS101 - Introduction to Computing

Dr. Mohammad Nauman

Assistant Professor (CS)
FAST National University of Computer and Emerging Sciences
mohammad.nauman@nu.edu.pk
http://recluze.wordpress.com

Warning!

You are not expected to understand all of this content fully (at the moment) ... but feel free to ask questions and discuss



Introduction

Operating systems

Operating systems are the souls of computers

They decide the behavior of computers and the interactions you have with them

Operating systems

Operating systems are the souls of computers

They decide the behavior of computers and the interactions you have with them

For instance, if you are a Windows user – normal mode of interaction is a GUI

For Linux users, the shell is much more common

Operating systems

Operating systems are the souls of computers

They decide the behavior of computers and the interactions you have with them

For instance, if you are a Windows user – normal mode of interaction is a GUI

For Linux users, the shell is much more common

What do operating systems do?

Operating systems

Operating systems are the souls of computers

They decide the behavior of computers and the interactions you have with them

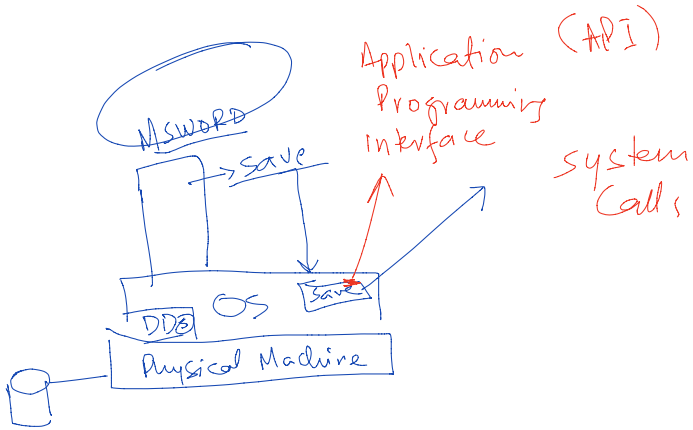
For instance, if you are a Windows user – normal mode of interaction is a GUI

For Linux users, the shell is much more common

What do operating systems do?

System calls and Application Programming Interface

The Role of an OS

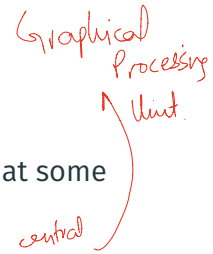


The social computer

Computers do not operate in isolation

Some computers are good at one function, others at some different one

For instance, one computer might have a very good CPU/GPU – another might have a huge storage capacity



Paradigms of execution

Cloud Computing

You might have heard about super computers

The immense power of super computers can be emulated with the concepts of High Performance Computing

Clustering

Cloud Computing

You might have heard about super computers

The immense power of super computers can be emulated with the concepts of High Performance Computing

Cluster computing and grid computing puts several computers together to create extremely powerful functions

Amazon (among others) created such a large computing base for their online shop that they weren't using all of the power!

They decided to rent it out thus giving rise to the concept of cloud computing

The truth behind cloud computing

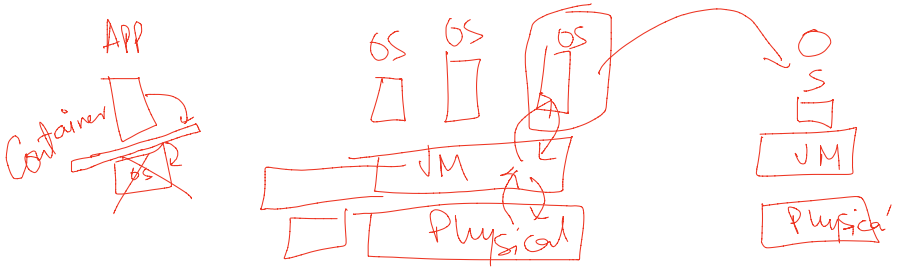
Recall what a “machine” does

The truth behind cloud computing

Recall what a "machine" does

What's stopping you from writing a machine that acts like the hardware you have

This is called a virtual machine!



VMs versus containers

Containers (see Docker) are light weight virtual machines (sort of)

Create once, deploy everywhere

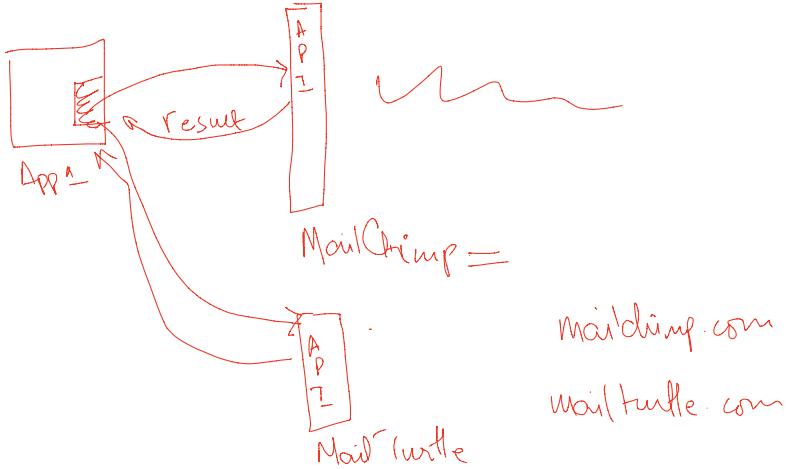
The social computer (continued)

But I don’t want to offload all computation

There are computation concerns as well as those related to security and privacy

Also, businesses can’t rely fully on other businesses for their operations

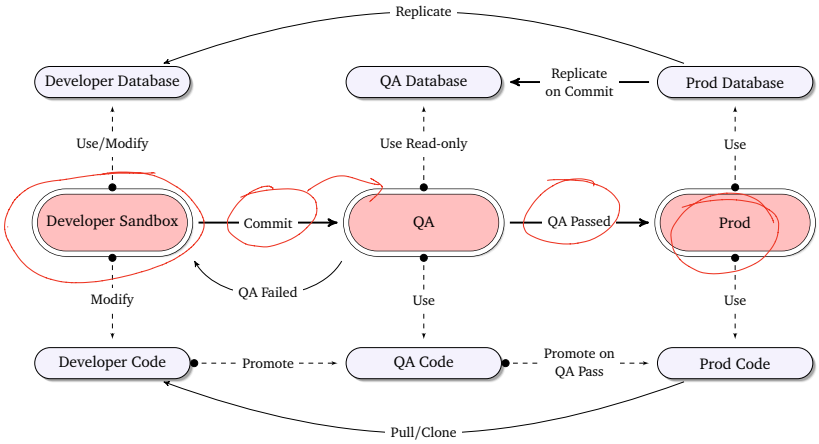
Networked APIs (and how to use them)



Trends in software development

Component-based construction

Typical workflow in production environment



Language agnosticism

You will notice that we have not talked about programming languages at all

This is because all of this holds for (almost) all languages (but not equally)

Some languages are good for some tasks, others … for other tasks

Language agnosticism

You will notice that we have not talked about programming languages at all

This is because all of this holds for (almost) all languages (but not equally)

Some languages are good for some tasks, others ... for other tasks

In this course, we will be starting with Python (but only because we have to pick a language)