Introduction to Operating Systems

Operating Systems I

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Course Objective

- The purpose of this course is to teach **interaction** of your programs to computer system
- The layer between applications and hardware is called **operating system**

Course Objective

- Topics we will cover:
  - Linux Usage and Programming Tools
  - Low-Level Topics in Programming
  - System Calls for Files and Processes API's
  - **Interprocess Communication – The next semester**
- Course Readings and Lectures will be published at **GitHub**:

  https://github.com/**victor-yacovlev**/**mipt-diht-caos**/

Scoring System

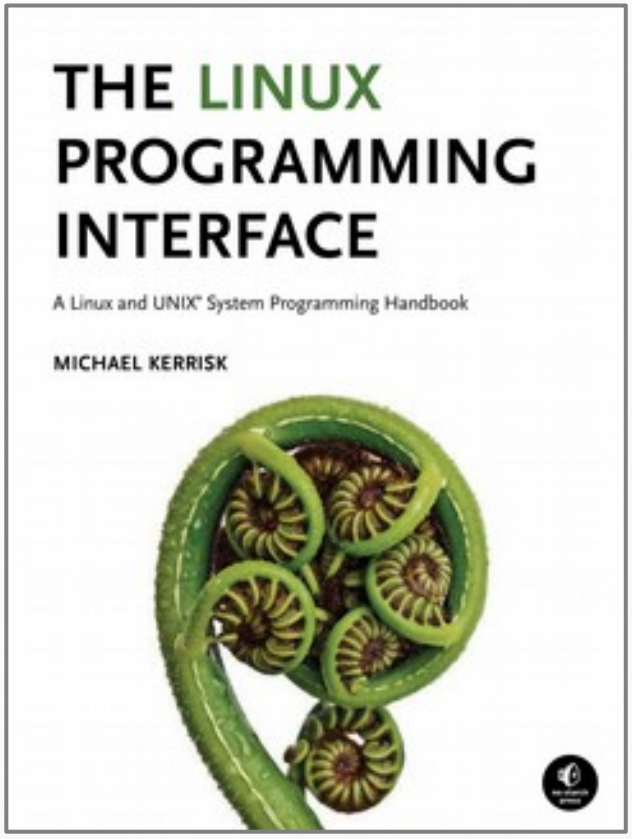
- 70% - for Practice
  - Four homeworks
  - Starts from Week 4.
- 30% - for Exam

Course Textbook

- The Linux Programming Interface
  Michael Kerrisk, No Starch Press, 2010

- This Course Reading
  github.com/victor-yacovlev/mipt-diht-caos/

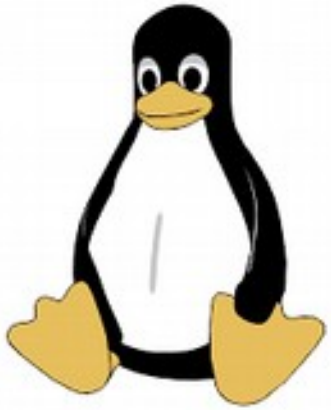
- Linux Manual Pages
  Will be discussed today



What is an Operating System

- A **set of programs** that acts as an **intermediary** between **user applications** and computer **hardware**
- The core program which interacts bare to metal is called **kernel**

Which Operating System Do You Use?



All of them but Windows are **UNIX-like systems**

Operating System Layers

- Applications
- Unprivileged Operating System Components:
  - **Shell** or **Desktop Environment** – provides interaction
  - **Services (Daemons)** – work in background
  - **System Commands** – called by users directly or by many components above
  - **System Libraries** – used by all components above
- Priveleged Level:
  - **The Kernel** – interacts to hardware

This Course Operating System is GNU/LINUX

- **It is Open Source** – well studied
- **It is UNIX-like**
  - [mostly] source-compatible to all UNIX variants
  - if you know how Linux designed that you know how designed FreeBSD, Solaris, MacOS, Android etc.
- **It is Free** – you can legally download and use without payment

But Linux – Just a Kernel...

- **Ubuntu** [https://ubuntu.com/] – The most popular and user-friendly Linux distribution
- **Fedora** [fedoraproject.org] – For technical minded users
- **ArchLinux** [https://www.archlinux.org/] – For red eyed hackers
- **CentOS/RedHat/Debian/SUSE** – For enterprise

There is no common recipe which distro to use

But if I have Windows installed?

- **Virtualization:**
  you can install almost **any** operating system as **guest** system as regular application
- **VirtualBox [https://www.virtualbox.org/]**
  - has good Linux support both as guest and host system
  - works fast enough
  - it’s free

The first task to be done at home

- Install VirtualBox and Linux Operating System as guest to your laptop
- Hints:
  1) do not allocate too much memory for guest system. 2Gb is usually enough if you follow Hint #2
  2) choose lightweight Desktop Environment (LXDE or XFCE)
- It is NOT a home work to be scored…
- … but it's REQUIRED prerequisite to perform home works