

CSGE602055 Operating Systems

CSF2600505 Sistem Operasi

Week 02: Protection, Security, Privacy, & C-language

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<http://rms46.vlsm.org/2/207.html>

Always check for the latest revision!

REV119 20-FEB-2018

Operating Systems 2018-1 (Room 3114 Tue/Thu)

Class: A (10:00-12:00) | B (13:00-15:00) | C (16:00-18:00)

| Week | Schedule | Topic | OSC9 |
|----------|----------------------|--|----------------|
| Week 00 | 06 Feb - 12 Feb 2018 | Intro & Review1 | Ch. 1, 16 |
| Week 01 | 13 Feb - 19 Feb 2018 | Review2 & Scripting | Ch. 1, 2 |
| Week 02 | 20 Feb - 26 Feb 2018 | Protection, Security, Privacy, & C-language | Ch. 14, 15 |
| Week 03 | 27 Feb - 05 Mar 2018 | I/O, BIOS, Loader, & Systemd | Ch. 13 |
| Week 04 | 06 Mar - 12 Mar 2018 | Addressing, Shared Lib, & Pointer | Ch. 8 |
| Week 05 | 13 Mar - 19 Mar 2018 | Virtual Memory | Ch. 9 |
| Reserved | 20 Mar - 24 Mar 2018 | | |
| Mid-Term | 26 Mar - 03 Apr 2018 | (UTS) | |
| Week 06 | 05 Apr - 11 Apr 2018 | Concurrency: Processes & Threads | Ch. 3, 4 |
| Week 07 | 12 Apr - 18 Apr 2018 | Synchronization | Ch. 5, 7 |
| Week 08 | 19 Apr - 25 Apr 2018 | Scheduling | Ch. 6 |
| Week 09 | 26 Apr - 05 May 2018 | File System & Persistent Storage | Ch. 10, 11, 12 |
| Week 10 | 07 May - 16 May 2018 | I/O Programming & Network Sockets Programming | |
| Reserved | 17 May - 22 May 2018 | | |
| Final | 23 May - 26 May 2018 | (UAS) | |
| Deadline | 07 Jun 2018 16:00 | Extra assignment deadline | |

• Operating Systems Check List

- ☐ Trace this document from <http://rms46.vlsm.org/2/207.html>
- ☐ Have a decent OS Book and map it to **OSC9**.
- ☐ Create **public** project "os181" on your github.com account.
 - ☐ Write in "README.md" file:
 - Special for Week 00: "**ZCZC Sistem Operasi 2018 Awal (1)**".
 - Add line on Week01: "**ZCZC W01 ...**".
 - On Week02: "**ZCZC W02 ...**".
 - On WeekXX: "**ZCZC WXX ...**".
- ☐ Encode your **QRC** with image size of approximately 250x250 pixels:
"**OS181 CLASS ID GITHUB-ACCOUNT SSO-ACCOUNT SIAK-Full-Name**"
Special for Week 00: Mail your **embedded** QRC to: os181@vlsm.org
with Subject: [W00] CLASS ID SIAK-NAME.
- ☐ Write your Memo (with QRC) **every week**.
- ☐ Using your **SSO** account, login to badak.cs.ui.ac.id via kawung.cs.ui.ac.id.
 - ☐ Check folder badak:///extra/Week00/
 - ☐ Week00: Copy the folder to your home directory:

```
cp -r /extra/Week00/W00-demos/ W00-demos/
```
 - ☐ For WeekXX: Copy the folder to your home directory:

```
cp -r /extra/WeekXX/WXX-demos/ WXX-demos/ (XX=01, 02,... 10).
```
- ☐ **How to improve this document?**

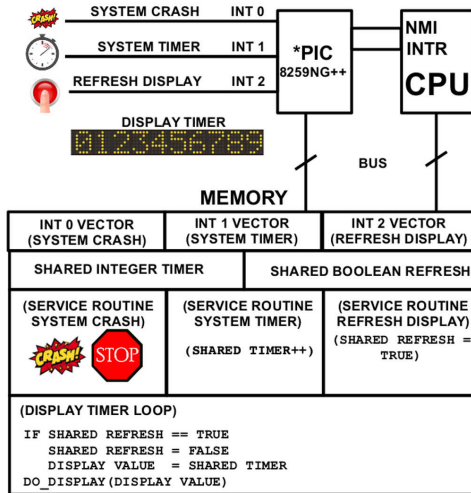
Agenda

- 1 Start
- 2 Jadwal
- 3 Agenda
- 4 Week 02
- 5 Goals and Principles of Protection
- 6 The Security Problem
- 7 Privacy
- 8 C Language
- 9 Week 02: Problems
- 10 Week 02: Summary
- 11 Week 02: Check List
- 12 The End

Week 02: Protection, Security, Privacy, & C-language

- Reference: (OSC9-ch14 OSC9-ch15 demo-w02)
- Goals of Protection
- Domain and Access Matrix
- ACL: Access Control List
- The Security Problem
- Threats: Trojan Horse, Trap Door, Overflow, Viruses, Worms, Port Scanning, DOS (Denial of Service).
- Cryptography: (Symmetric and Asymmetric) Encryption,
- User Authentication: Password, Biometrics.
- Implementing Security Defenses: Policy, Assesment, Prevention, Detection, Protection, Auditing.
- Privacy.

How to Protect?



(c) 2017 VauLSMorg – This is a free picture

Figure: How to protect and secure this design?

Goals and Principles of Protection

- Principle of Least Privilege
- Domain Structure and Access Matrix
- Domain = set of Access-rights (eg. **user-id**).
- Access-right = <object-name, rights-set> (eg. object: file).

| | File1 | File2 | File3 | Printer |
|-------|-------|-------|---------|---------|
| User1 | Read | | Read | |
| User2 | | | | Print |
| User3 | | Read | Execute | Print |
| User4 | R/W | | R/W | Print |

- Access-right Plus Domain (Users) as Objects

| | F1 | F2 | F3 | Printer | U1 | U2 | U3 | U4 |
|----|-----|----|------|---------|----|----|----|----|
| U1 | R | | R | | | SW | | |
| U2 | | | | Print | | | SW | SW |
| U3 | | R | EXEC | Print | | | | |
| U4 | R/W | | R/W | Print | SW | | | |

Copy Rights

- Start

| | File1 | File2 | File3 |
|-------|-------|-------|--------|
| User1 | Exec | | Write* |
| User2 | Exec | Read* | Exec |
| User3 | Exec | | |

- User3: Read access to File2 (by User2)

| | File1 | File2 | File3 |
|-------|-------|-------------|--------|
| User1 | Exec | | Write* |
| User2 | Exec | Read* | Exec |
| User3 | Exec | Read | |

- Owner Rights

| | File1 | File2 | File3 |
|-------|-------|-------------|------------|
| User1 | O & E | | W |
| User2 | | O & R* & W* | O & R* & W |
| User3 | | W | W |

The Security Problem

- Security Violation Categories
- Security Measure Levels
- Encryption
- Linux Security
- gnupg & sha1sum

- Privacy can mean different things in different contexts; different people, cultures, and nations have different expectations about how much privacy a person is entitled to or what constitutes an invasion of privacy.
- Considering all discussions as one of these concepts
 - Right to be let alone (such as one's own home).
 - Limited access (no information collection).
 - Control over information (in the era of big data).
 - States of privacy: solitude, intimacy, anonymity, and reserve.
 - Secrecy: does not apply for any already publicly disclosed.
 - Personhood and autonomy.
 - Self-identity and personal growth.

- Reference: (Any C Language Tutorial)

Week 02: Problems

- Tugas Minggu 02 (Week 02) ada dua:
 - Memo Week02: to be checked at break of the first lecture of WEEK 01.
 - Try Demo Week02 and write in "README.md" (os181), something like: "ZCZC W02 Demo: done!".

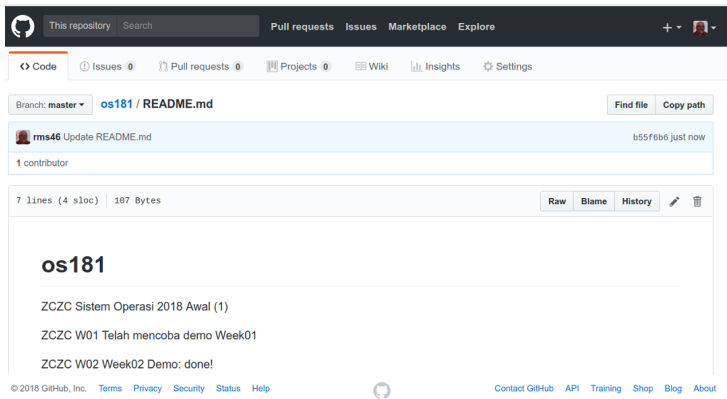


Figure: README.md: ZCZC W02 Demo: done!

Week 02: Summary

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- Domain and Access Matrix
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- The Security Problem
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☐ **How to improve this document?**

The End

- ☐ This is the end of the presentation.
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