Operating Systems 2023 Spring Term
Course Introduction

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Special thanks to Professors Serap Şahin and Işıl Öz.

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Course Objectives

- Operating system structures
- Processes and threads
- Scheduling
- Memory
- File system and storage
- Lab: Linux OS and examples using C programming language

Course Material

- Main Textbook:
  Silbershatz, Galvin, Gagne, "Operating System Concepts, 10th Ed."
- Supplementary Textbook:
  The Linux Programming Interface: Linux and UNIX System Programming Handbook by Michael Kerrisk , No Starch Press © 2010 (1556 pages) Citation, ISBN:9781593272203 (From database 7/24; library.books24x7.com

Course Platform

- Course material will be available on Microsoft Teams platform under under the Team named as **CENG322 OPERATING SYSTEMS - 2023 SPRING** with team code **aj0w2e7**
- Make sure that you are registered under the Team CENG322 OPERATING SYSTEMS - 2023 SPRING.
- Announcements will be made through Microsoft Teams. You will be assumed that you read them.
- Type of exams will be determined in April.

Tentative Schedule

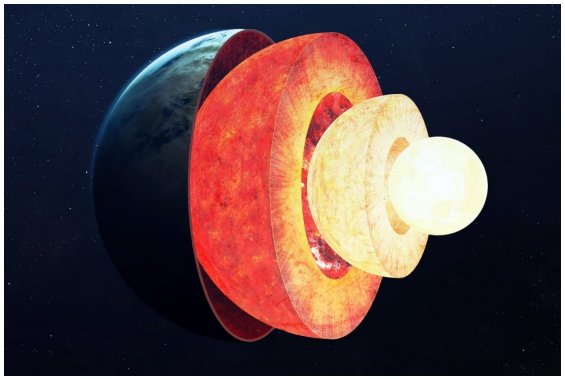
WEEK	DATE	LECTURE	LAB	TA Pair	HW Announcement	HW Collection	(O)nline|(In)person
1	09/03	OS overview	Linux intro, shell scripts	Altuğ, Hüseyin			O
2	16/03	Processes	Basic C	Burak, Ege	1		O
3	23/03	IPC	C pointers, struct	Altuğ, Hüseyin		1	O
4	30/03	Threads	Process	Burak, Ege	2		O
5	06/04	Synchronizaton	Process	Altuğ, Hüseyin			
6	13/04	Synchronizaton	Threads	Burak, Ege		2	
7	20/04	BAYRAM	NO LAB				
8	27/04	Deadlock	Synchronization	Altuğ, Hüseyin			
9	04/05	MIDTERM	NO LAB				
10	11/05	CPU Scheduling	HW2 demo	Burak, Ege	3		
11	18/05	Main Memory	NO LAB				
12	25/05	Virtual Memory	HW 4	Burak, Altuğ	4	3	
13	01/06	Storage, I/O	Memory management	Altuğ, Hüseyin			
14	08/06	File System	Recitation	All			
15	15/06	Distributed Systems	HW4 demo	Burak, Altuğ		4	
		FINAL					

Grading

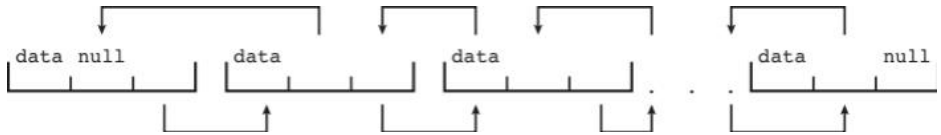
- 40% Assignments (4 homeworks, 10% each)
- 20% Midterm
- 40% Final
- Cheating in homeworks will result in getting 0
- Repetitive cheating will have worse results

Kernel Data Structures

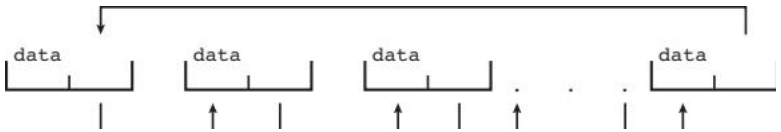
Figure: https://www.earth.com/news/layers-earths-core-oil-vinegar/



- Many similar to standard programming data structures such as Singly linked list
- Doubly linked list

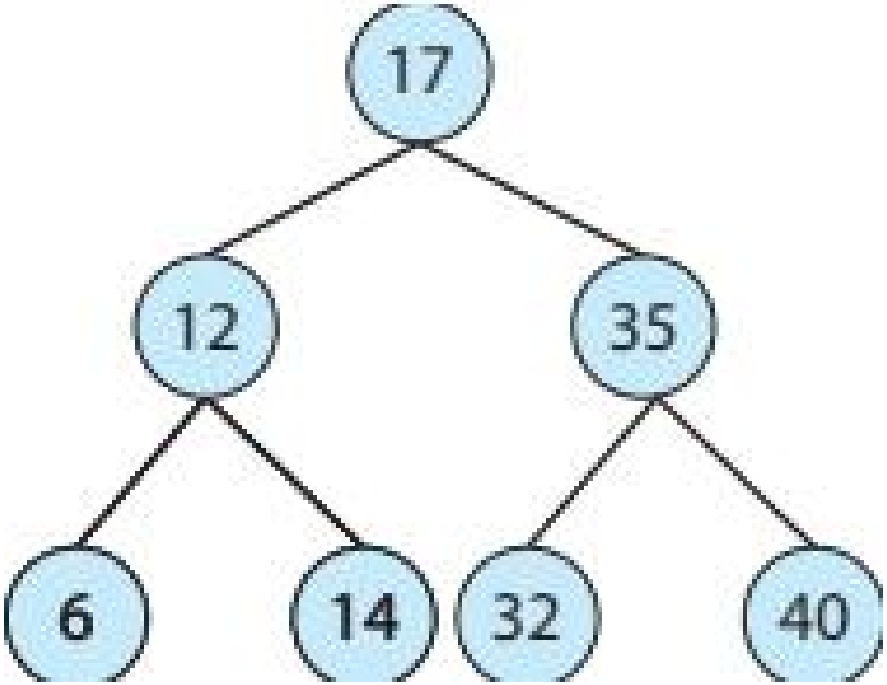


- Circular linked list



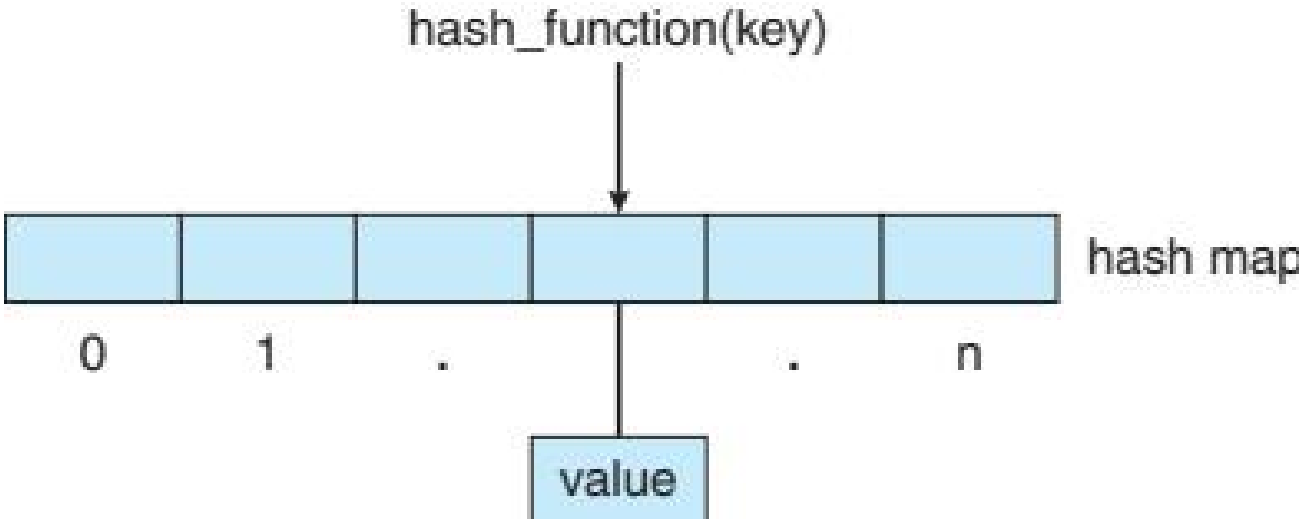
Kernel Data Structures: Binary search tree

- left <= right



Kernel Data Structures: Hash map

- Hash function can create a hash map
- Bitmap – string of n binary digits representing the status of n items
- Linux data structures defined in include files <linux/list.h>, <linux/kfifo.h>, <linux/rbtree.h>



Hadoop and MapReduce

Figure: http://mohamednabeel.blogspot.com/2011/03/starting-sub-sandwitch-business.html