

**Know your  
instructors**

**Describe  
course's  
objectives**

**Understand  
how to pass the  
course**

**Understand  
Binary  
Representation**



# Introduction

- ① Introduction
- ② Course's objectives
- ③ How to pass the course
- ④ Binary Representation

# Instructors

NGHIEM Q. Minh

LUONG V. Thang

HO T. Xanh





# Course's objectives

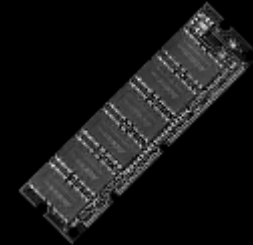


Representing  
information

Circuit  
Design



Computer's components



Memory  
System

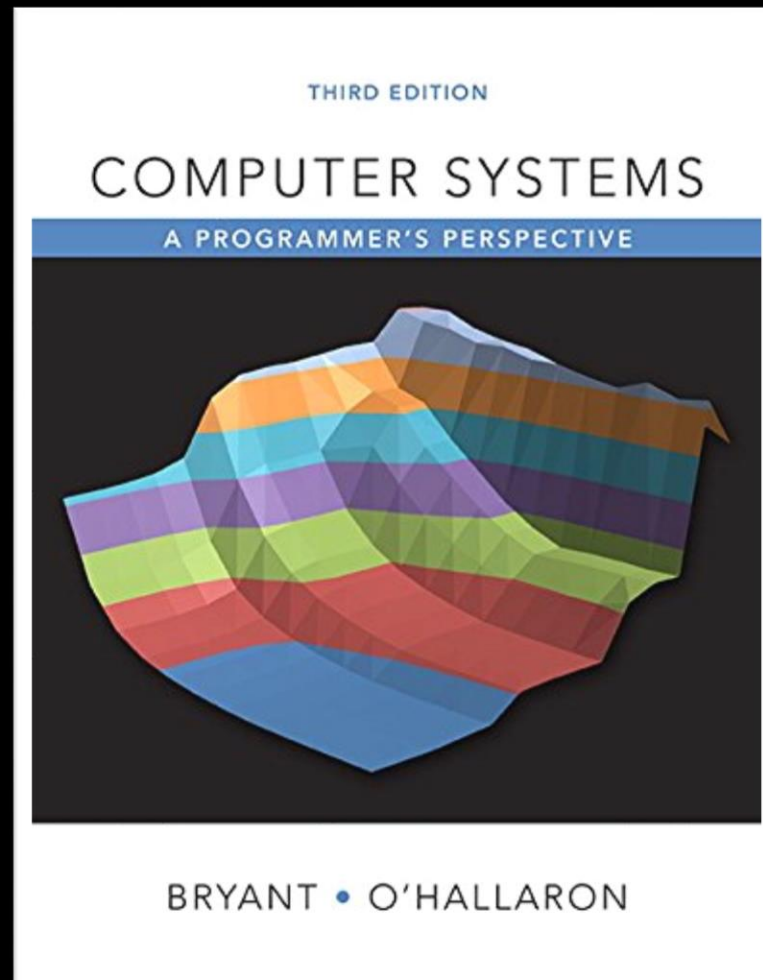
Optimizing  
Program  
Performance



Assembly  
Language



# Textbooks



<http://csapp.cs.cmu.edu/>

# Course's content

W	Topic	Textbook	Assign
1	Bits and Bytes	1.1-1.10, 2.1	Lab 1
2	Integers and Floating points	2.2-2.4	HW 1
3	Machine Programming	3.1-3.6	Lab 2
4	Machine Programming	3.7-3.9	HW 2
5	Machine Programming	3.10	Lab 3
6	Midterm		HW 3
7	The Memory Hierarchy	6.1-6.7	Lab 4
8	Virtual Memory	9.1-9.8	HW 4
9	Memory Allocation	9.9-9.13	Lab 5
10	Review		HW 5

# Why?



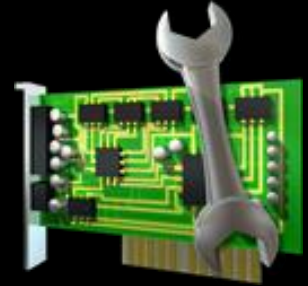
Understand  
security holes



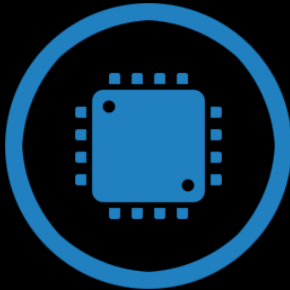
Debug without  
source code



Program  
OS



Control  
devices



Work on  
embedded systems

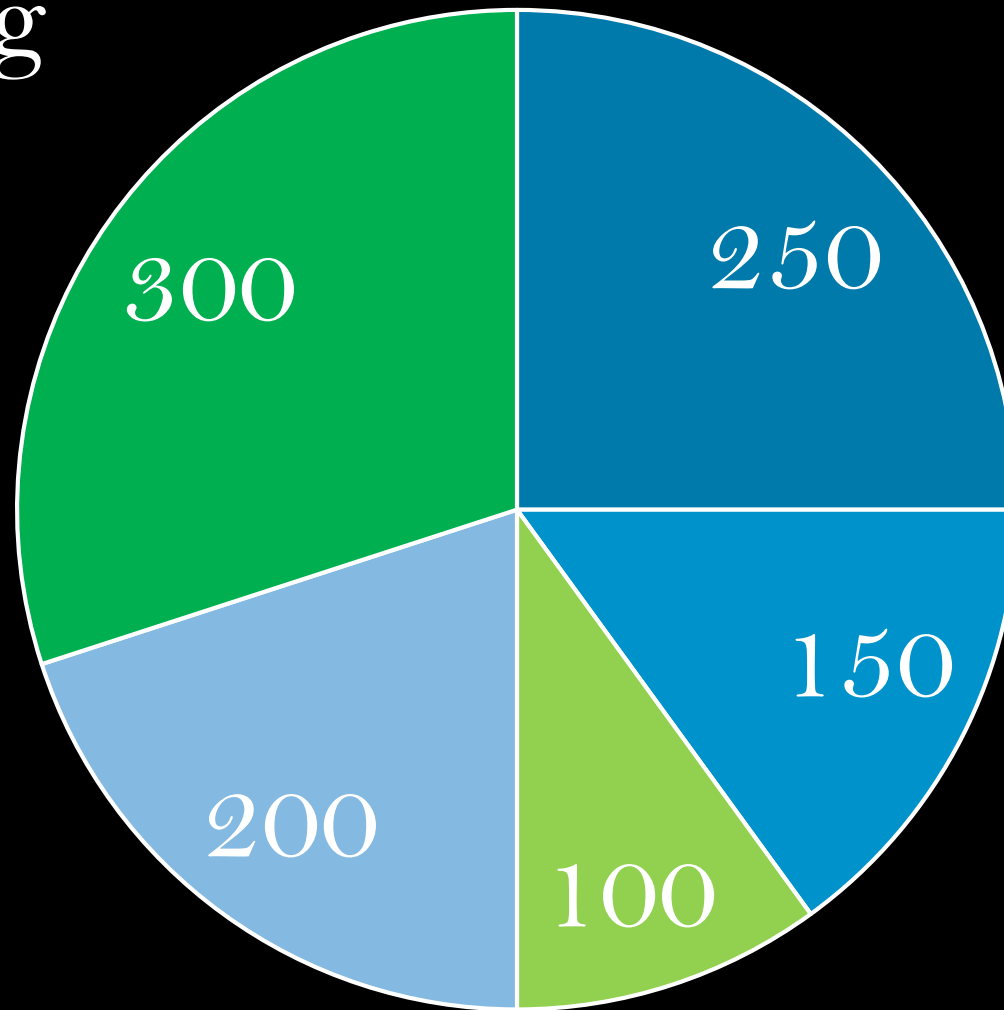


Write  
compilers



Get  
higher payment

# Grading



■ Lab      ■ Homework ■ Quizzes  
■ Midterm   ■ Final exam



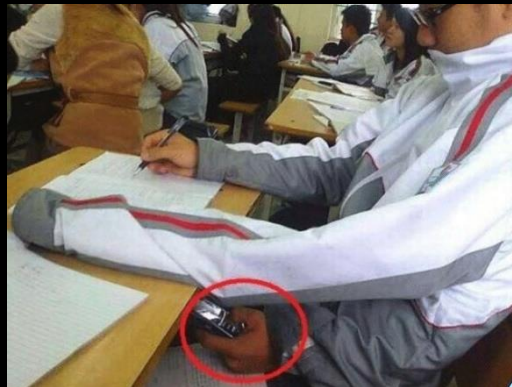
How to pass the course?

500 points



How to fail the course?

-50% points



1010111101001110101101000000111

01110100111111100011100111110101111010011101011010000000111

10101111010011101011010000000111

1111111000111001111101011111010011101011010000000111

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1010111010011101011010000000111

11001111101011111010011101011010000000111

10101111010011101011010000000111

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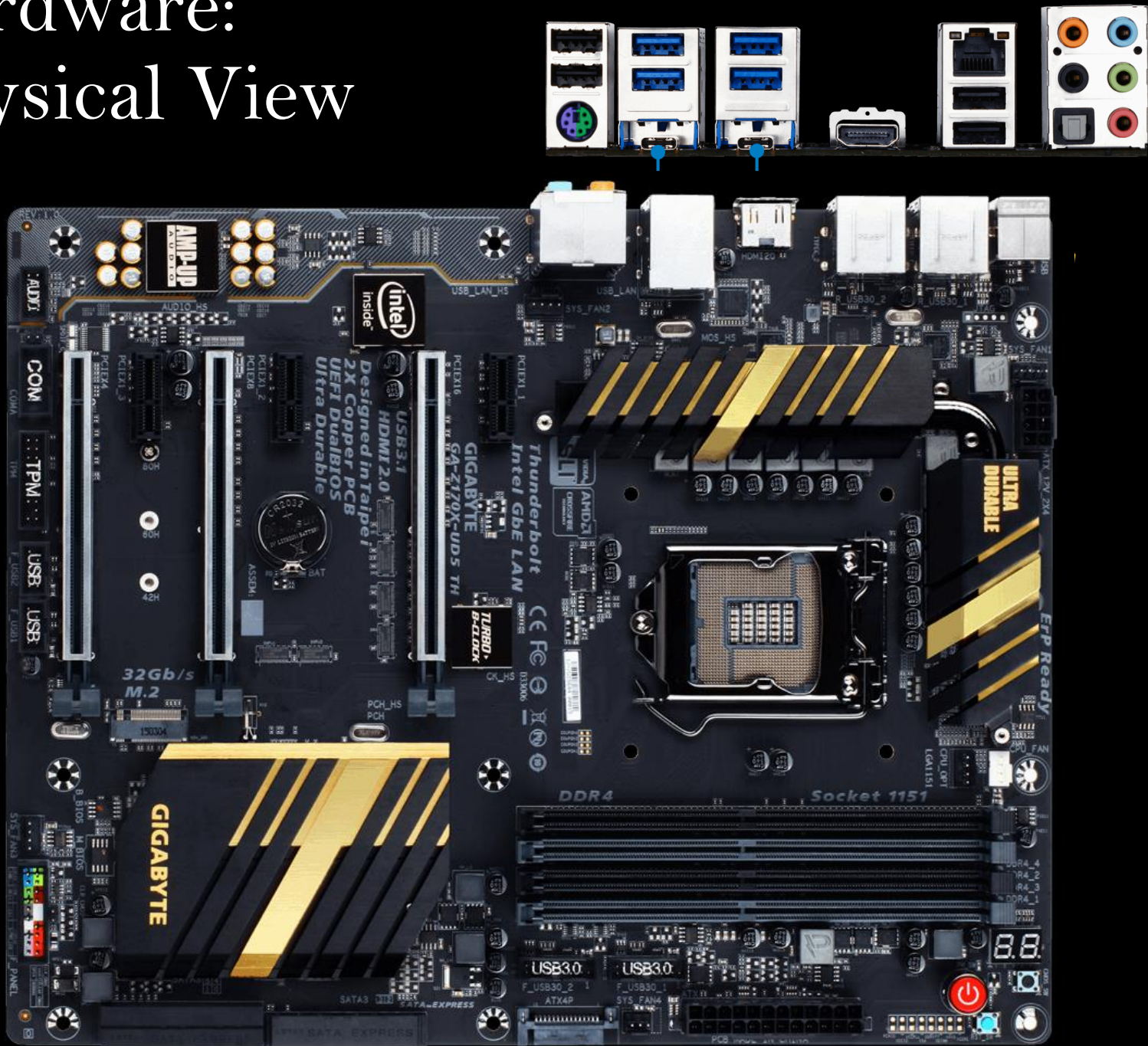
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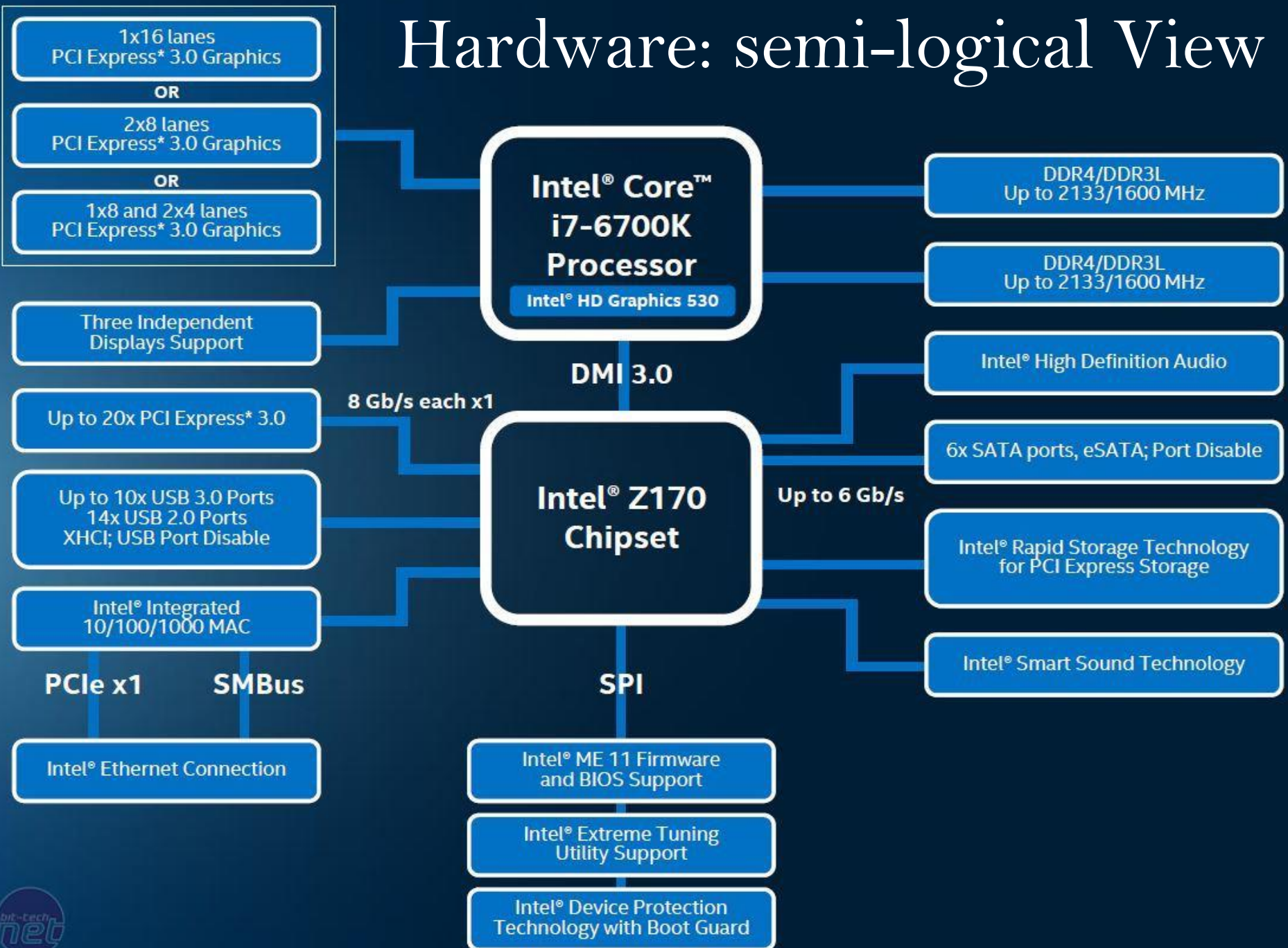
# Binary Representation



# Hardware: Physical View

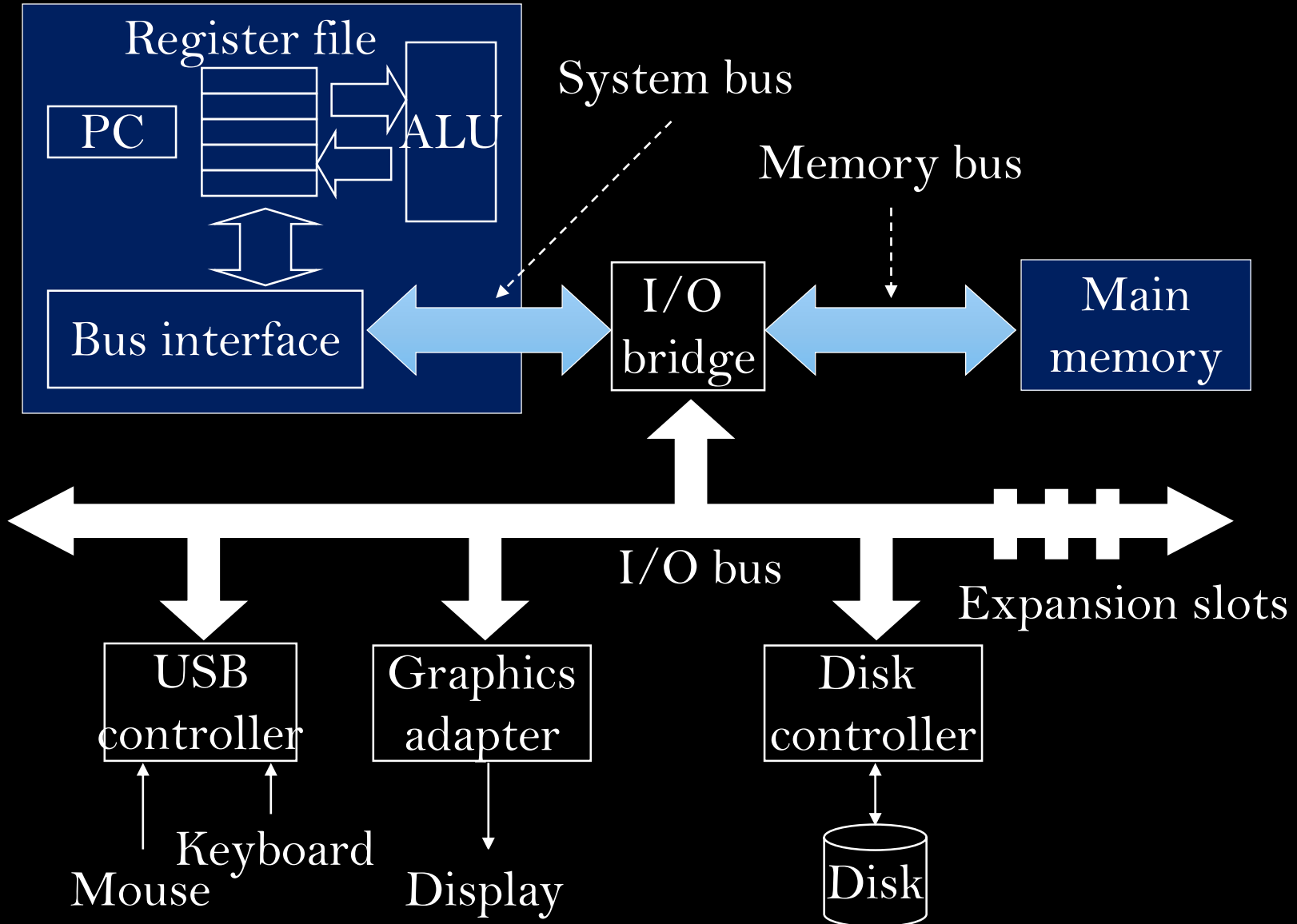


# Hardware: semi-logical View



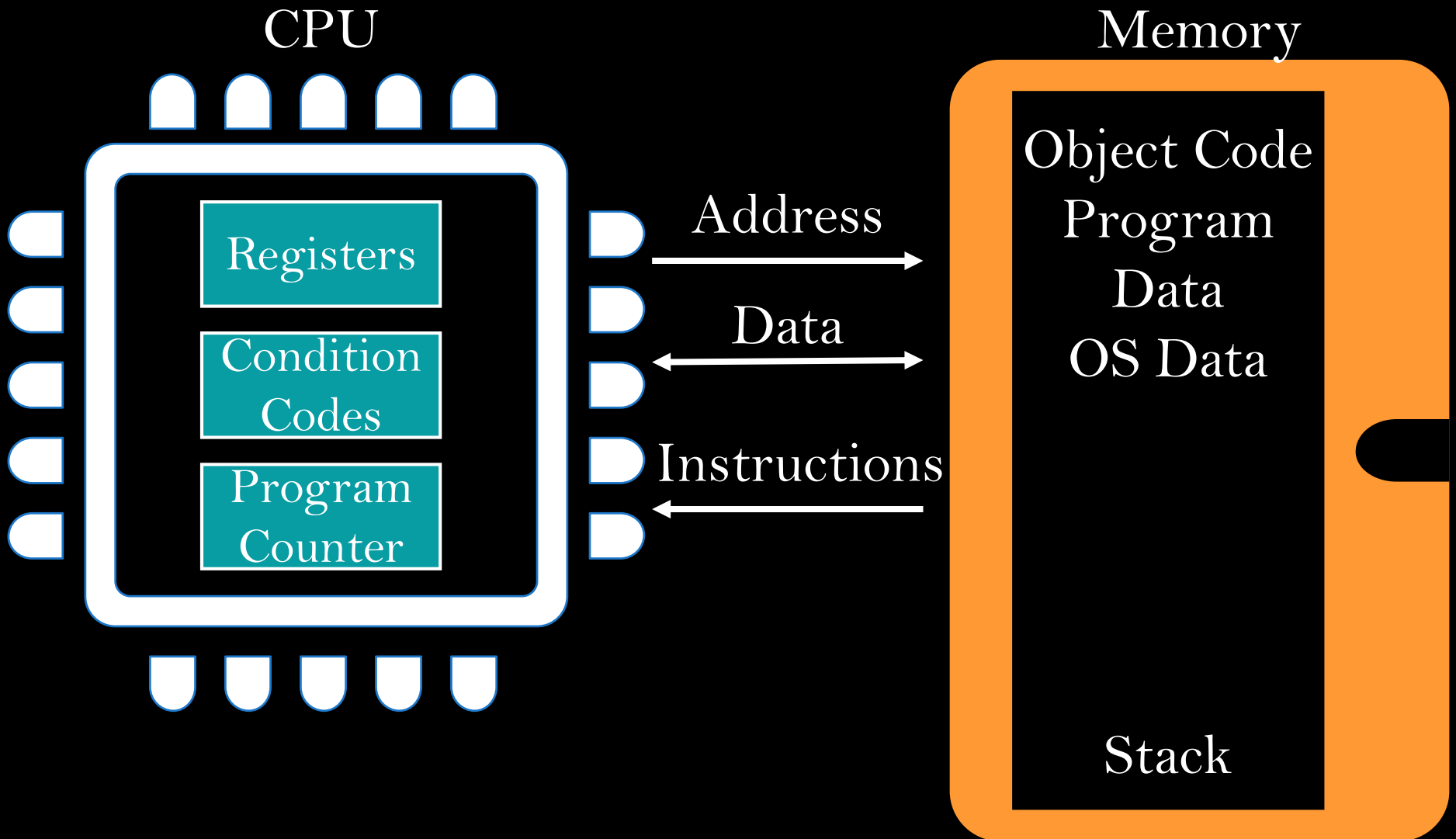
# Hardware: Logical View

CPU

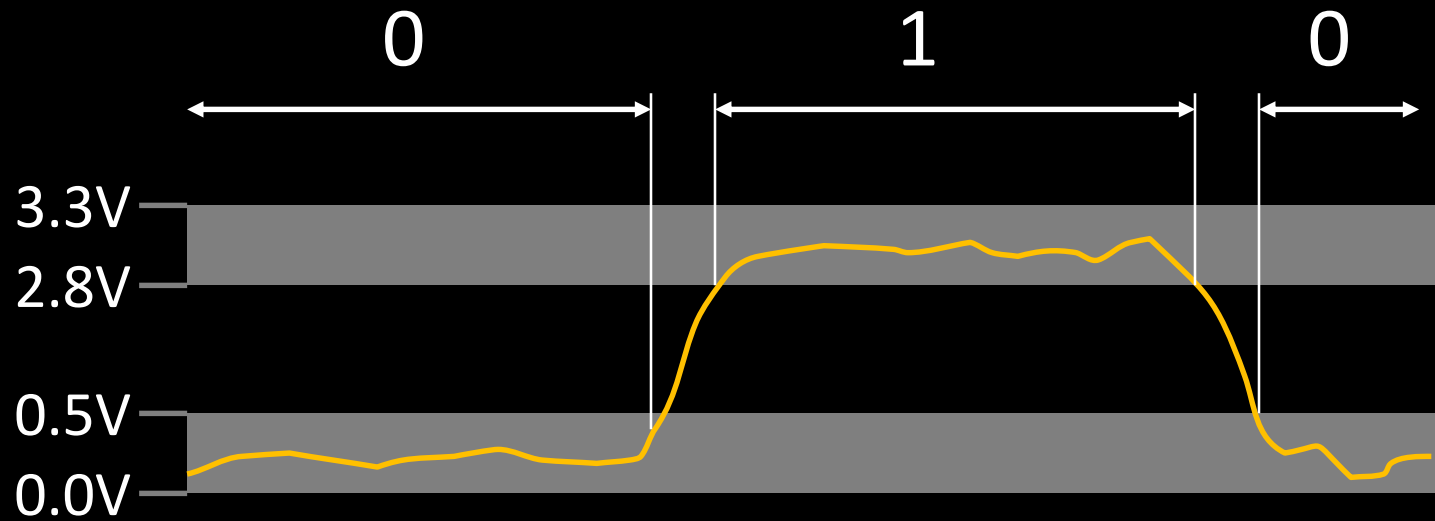




# Programmer's View



# Binary Representation



Binary				Dec	Hex
0	0	0	0	0	0
0	0	0	1	1	1
0	0	1	0	2	2
0	0	1	1	3	3
0	1	0	0	4	4
0	1	0	1	5	5
0	1	1	0	6	6
0	1	1	1	7	7

Binary				Dec	Hex
1	0	0	0	8	8
1	0	0	1	9	9
1	0	1	0	10	A
1	0	1	1	11	B
1	1	0	0	12	C
1	1	0	1	13	D
1	1	1	0	14	E
1	1	1	1	15	F

# To do

1. Read chapter 1 “A Tour of Computer System”
2. Watch the lectures in advance “Bits, Bytes, and Ints: Part 1”

<http://www.cs.cmu.edu/afs/cs/academic/class/15213-f15/www/schedule.html>



Niklaus Wirth

“

software is getting slower  
more rapidly than  
hardware becomes faster

”