



UNIVERSITAS SAM RATULANGI MANADO
FAKULTAS TEKNIK, JURUSAN TEKNIK ELEKTRO
Program Studi S-1 Teknik Informatika

Pemrograman Komputer: Dari 0/1 ke Program

Mata Kuliah: Algoritma & Logika Informatika (IFC3504)

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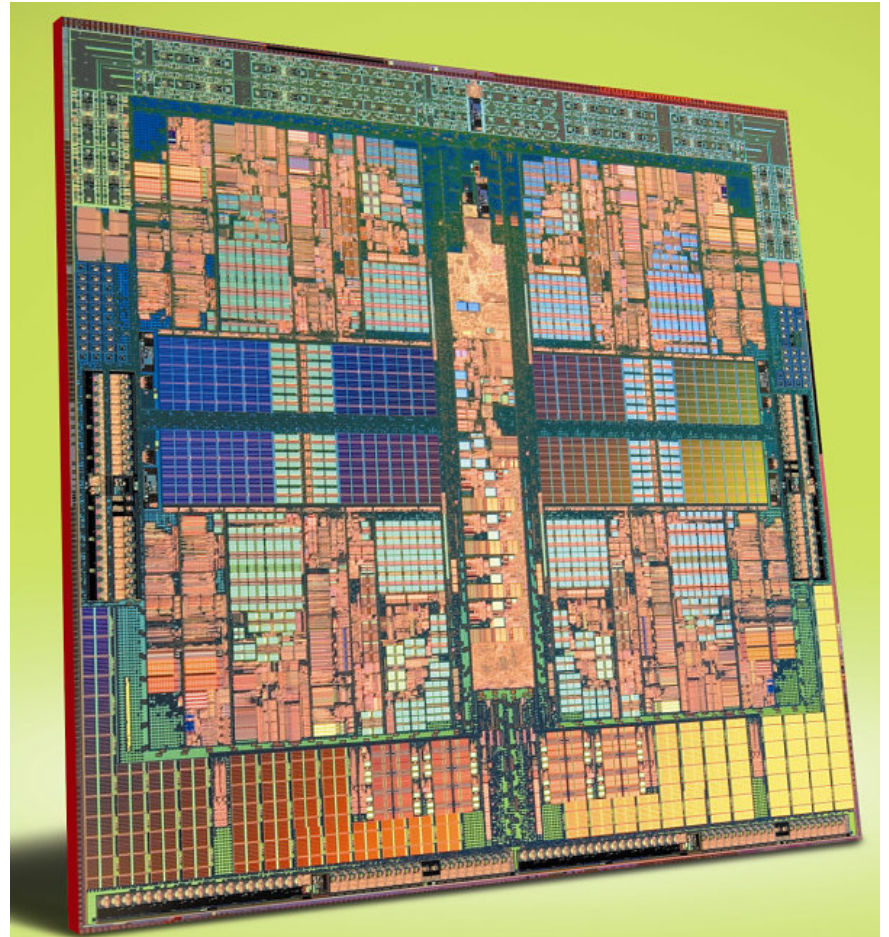
Central Processing Unit (CPU)

2



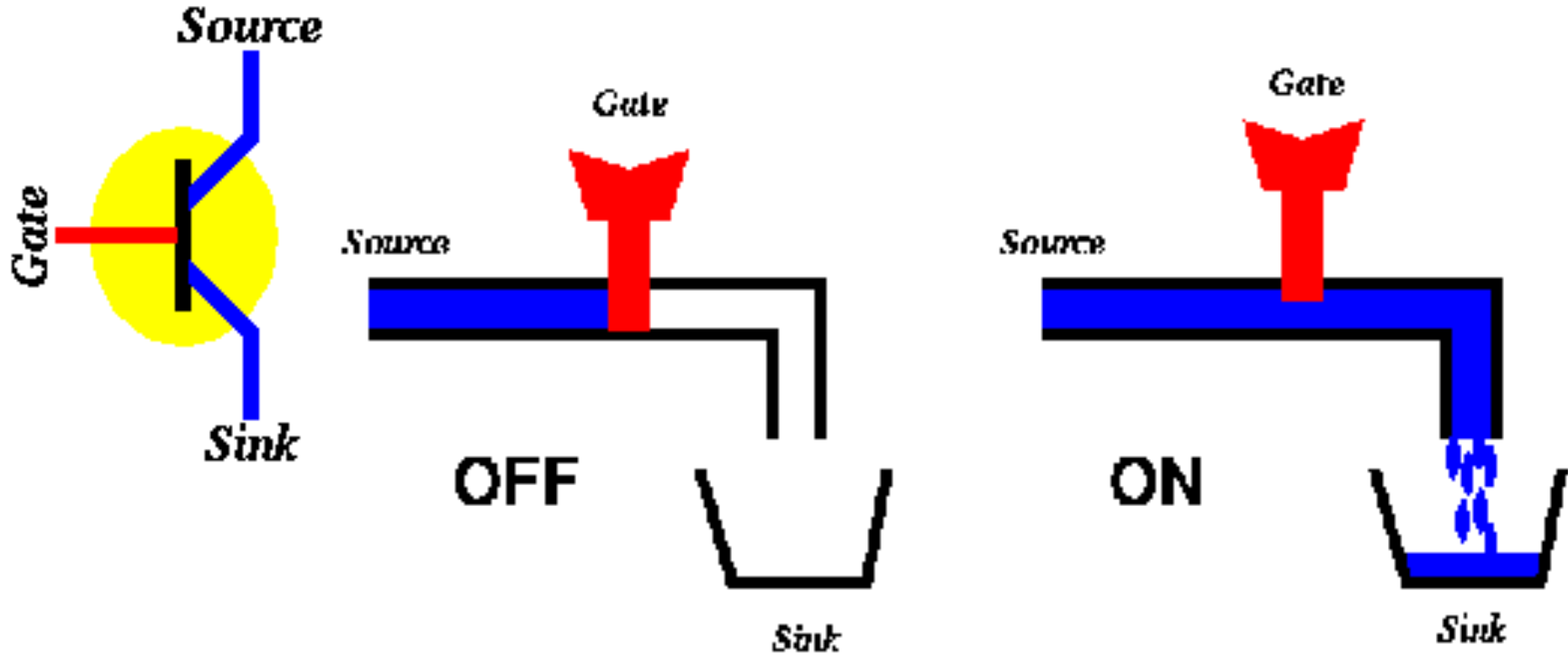
Transistors

3



ON dan OFF = 0 dan 1

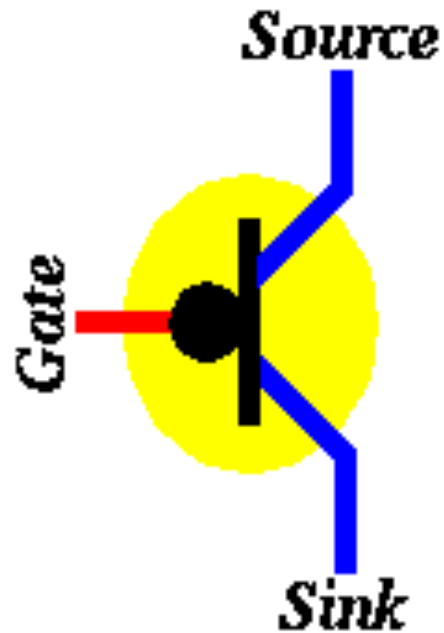
4



CMOS

5

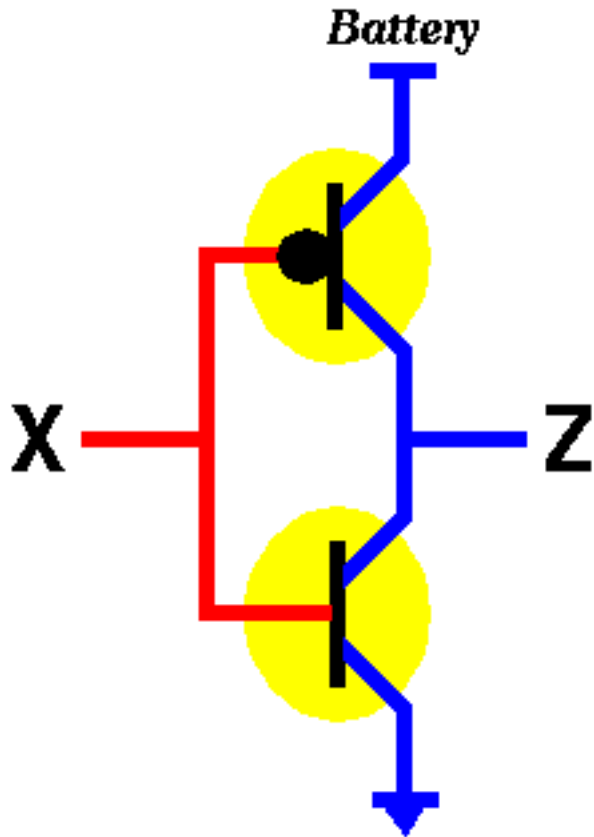
CMOS = Complementary Metal Oxide Semiconductor



Bekerja sebaliknya:
Gate OFF = ON, Gate ON = OFF

Gerbang Logika: NOT

6



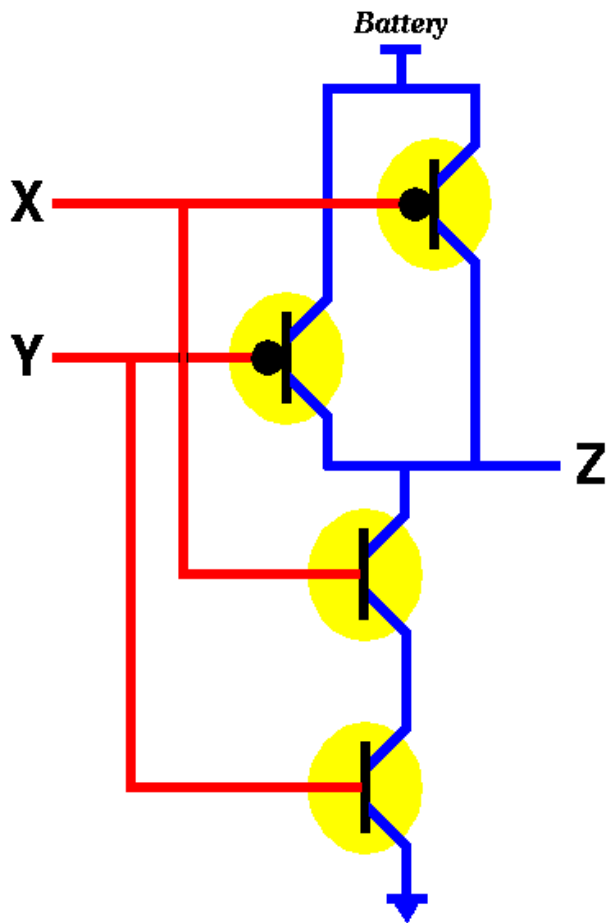
Tabel Kebenaran:

NOT

X	Z
0	1
1	0

Gerbang Logika: NAND

7



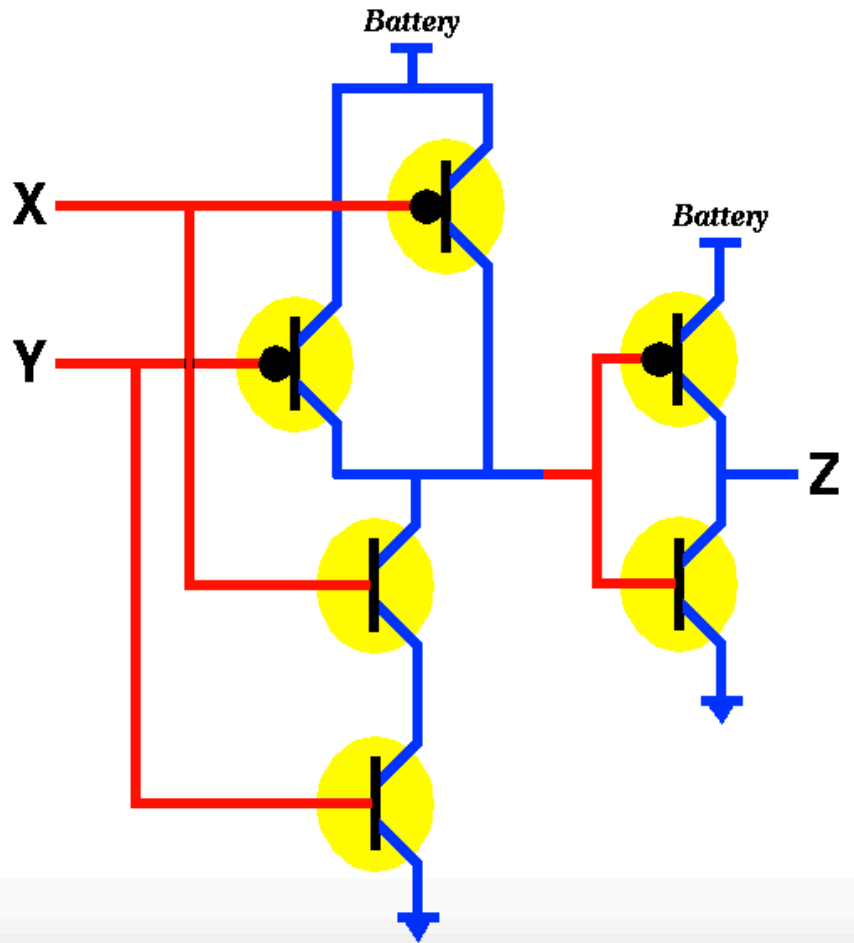
Tabel Kebenaran:

NAND

X	Y	Z
0	0	1
0	1	1
1	0	1
1	1	0

Gerbang Logika: AND

8



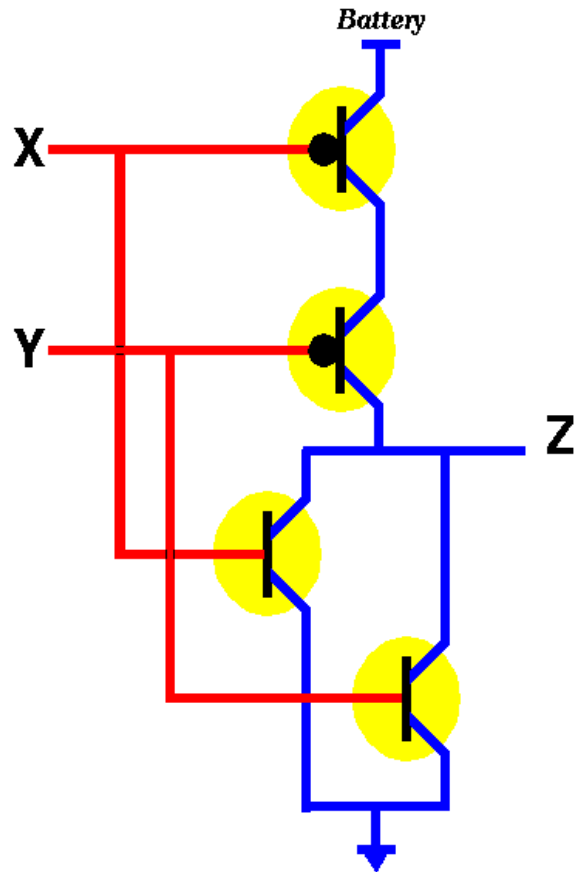
Tabel Kebenaran:

AND

X	Y	Z
0	0	0
0	1	0
1	0	0
1	1	1

Gerbang Logika: NOR

9



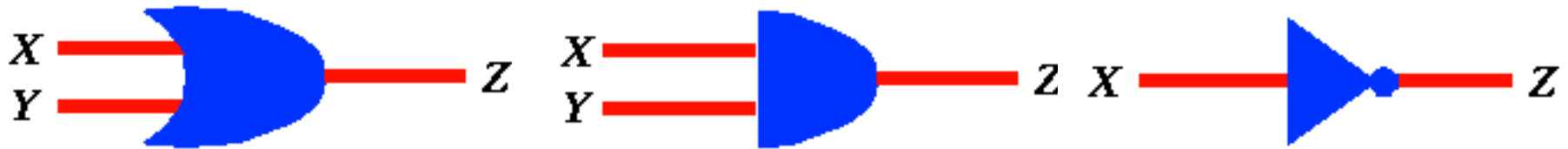
Tabel Kebenaran:

NOR

X	Y	Z
0	0	1
0	1	0
1	0	0
1	1	0

Simbol2 Gerbang Logika

10



OR

X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	1

AND

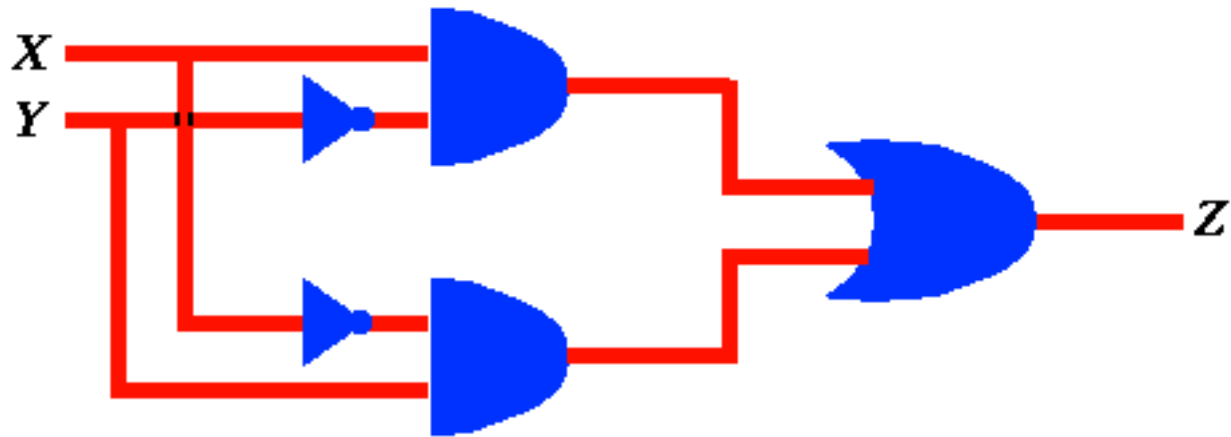
X	Y	Z
0	0	0
0	1	0
1	0	0
1	1	1

NOT

X	Z
0	1
1	0

Rangkaian Logika

11



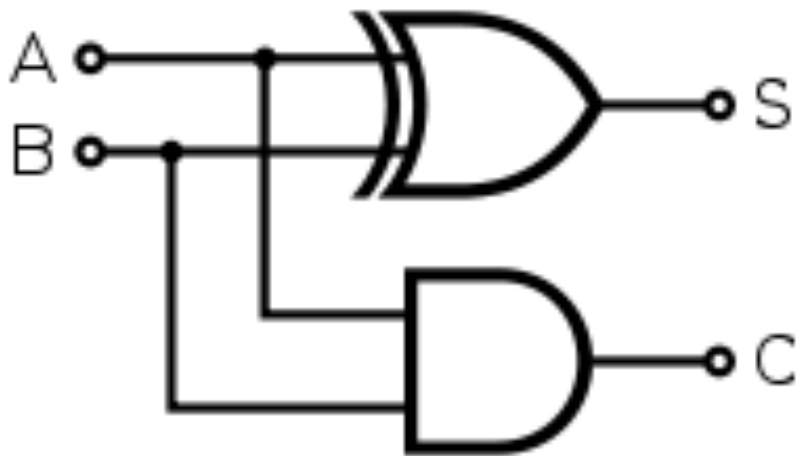
XOR

X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0



Rangkaian Adder (Penjumlah)

12



$$\begin{array}{r} 10110 : 22 \\ 11001 : 25 \\ \hline 101111 : 47 \end{array} +$$

Sistem Bilangan Desimal

13

99₁₀

10,000,000	1,000,000	100,000	10,000	1,000	100	10	1
10^7	10^6	10^5	10^4	10^3	10^2	10^1	10^0

9 9 = 99

Konversi Bilangan Biner ke Desimal

14

$$1100011_2 = 99_{10}$$

128	64	32	16	8	4	2	1									
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0									
<hr/>																
0	1	1	0	0	0	1	1									
0	+	64	+	32	+	0	+	0	+	0	+	2	+	1	=	99

Konversi Bilangan Desimal ke Biner

15

$$99_{10} = 1100011_2$$

99/2	=	49,	with remainder	1
49/2	=	24,	with remainder	1
24/2	=	12,	with remainder	0
12/2	=	6,	with remainder	0
6/2	=	3,	with remainder	0
3/2	=	1,	with remainder	1
1/2	=	0,	with remainder	1



Microcode

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- Microcode = instruksi yg mewakili operasi2 dasar
- Microcode dikodekan ke dalam angka biner
- Contoh:
 - ▣ 76 = operasi penjumlahan
 - ▣ 76 2 3 4 = jumlahkan (76) dua angka dari alamat memory 2 dan 3, hasilnya diletakkan di alamat memory 4
 - ▣ Representasi biner dari microcode di atas:
1001100 0000010 0000011 0000100
 - ▣ Bahasa mesin menggunakan microcode seperti ini.

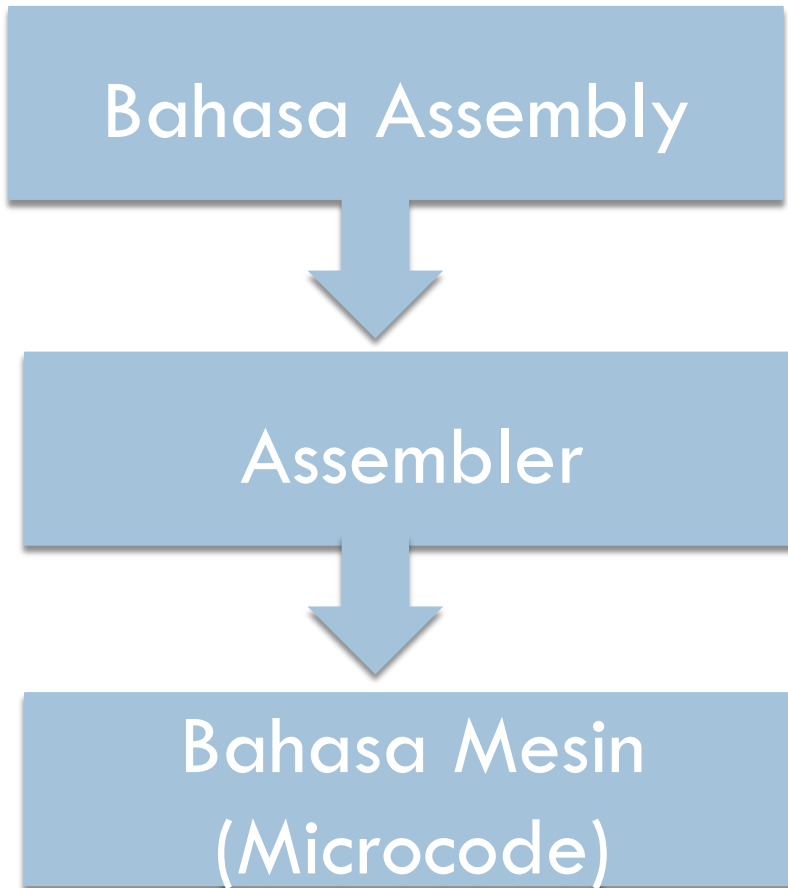
Bahasa Mesin dalam Memori

17

Address	Machine Language			
0000 0000	0000	0000	0000	0000
0000 0001	0000	0000	0000	0010
0000 0010	0000	0000	0000	0011
0000 0011	0001	1101	0000	0001
0000 0100	0001	1110	0000	0010
0000 0101	0101	1111	1101	1110
0000 0110	0010	1111	0000	0000
0000 0111	1111	0000	0000	0000

Assembly = Bhs.Pem. Tingkat Rendah

18



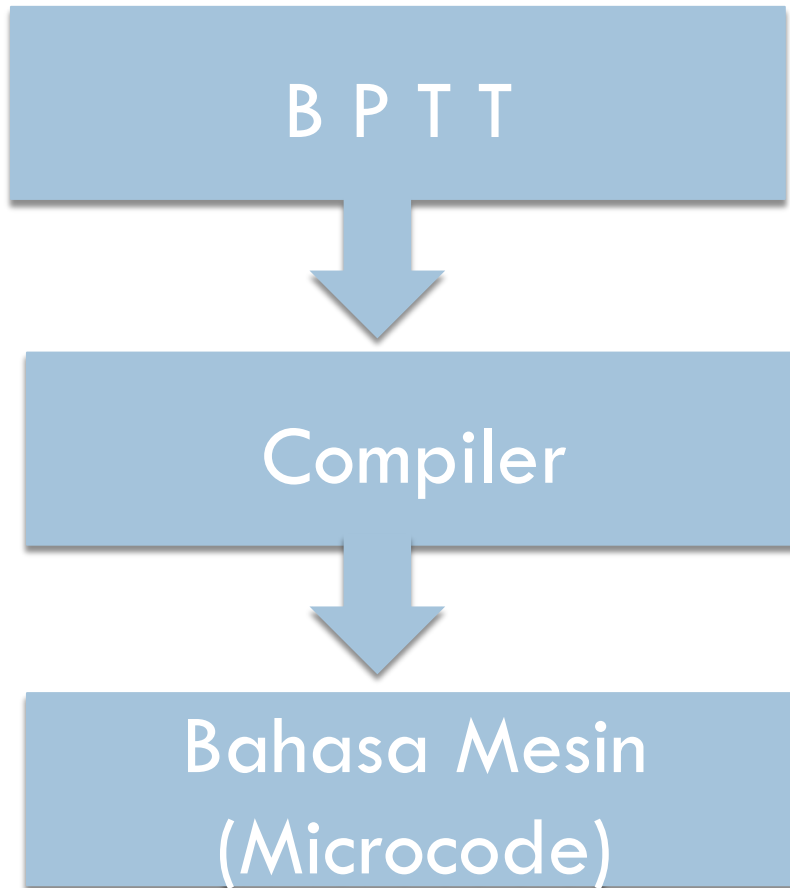
ADD [2], [3] -> [4]



76 2 3 4

Bahasa Pemrograman Tingkat Tinggi

19



X = 22 + 25;



76 2 3 4

