Basic Concept of Binary Representation

Number of operation = 2^N

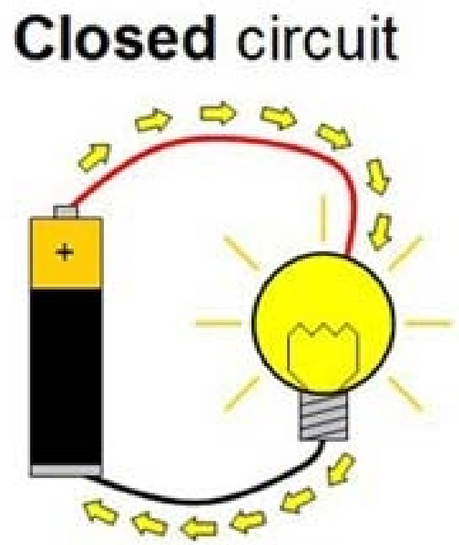
N is number of digit

Ex.
if we have 1 digit
Number of operation is 2^1 = 2 operations

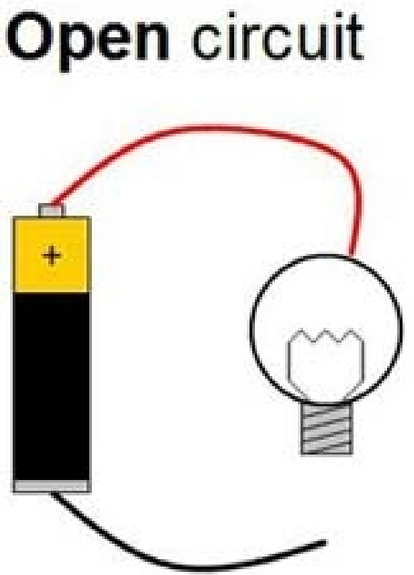
1 digit can be
0 or 1

where
0 is closed
1 is opened

0



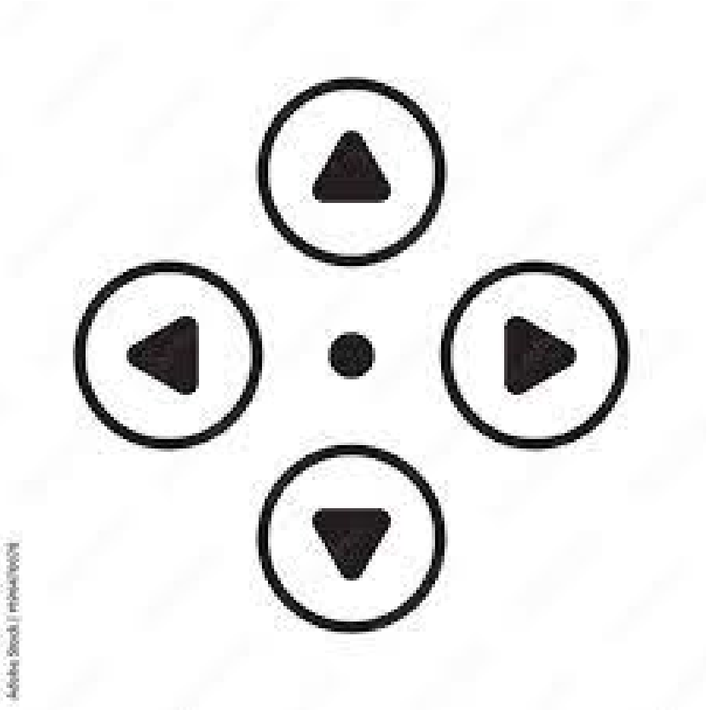
1



Ex.
if we have 2 digit
Number of operation is 2^2 = 4 operations

2 digit can be
00, 01, 10, 11

where
00 is left
01 is right
10 is up
11 is down



Mini Workshop

Question 1.
How many digit to perform Latin alphabet ? (26 elements)

Question 2.
How many digit to perform color in RGB (Red = 256 channel, Green=256 channel, Blue = 256 channel)

Question 3.
How many digit to perform color in Alpha RGB (Red = 256 channel, Green=256 channel, Blue = 256 channel, Alpha = 256 channel)

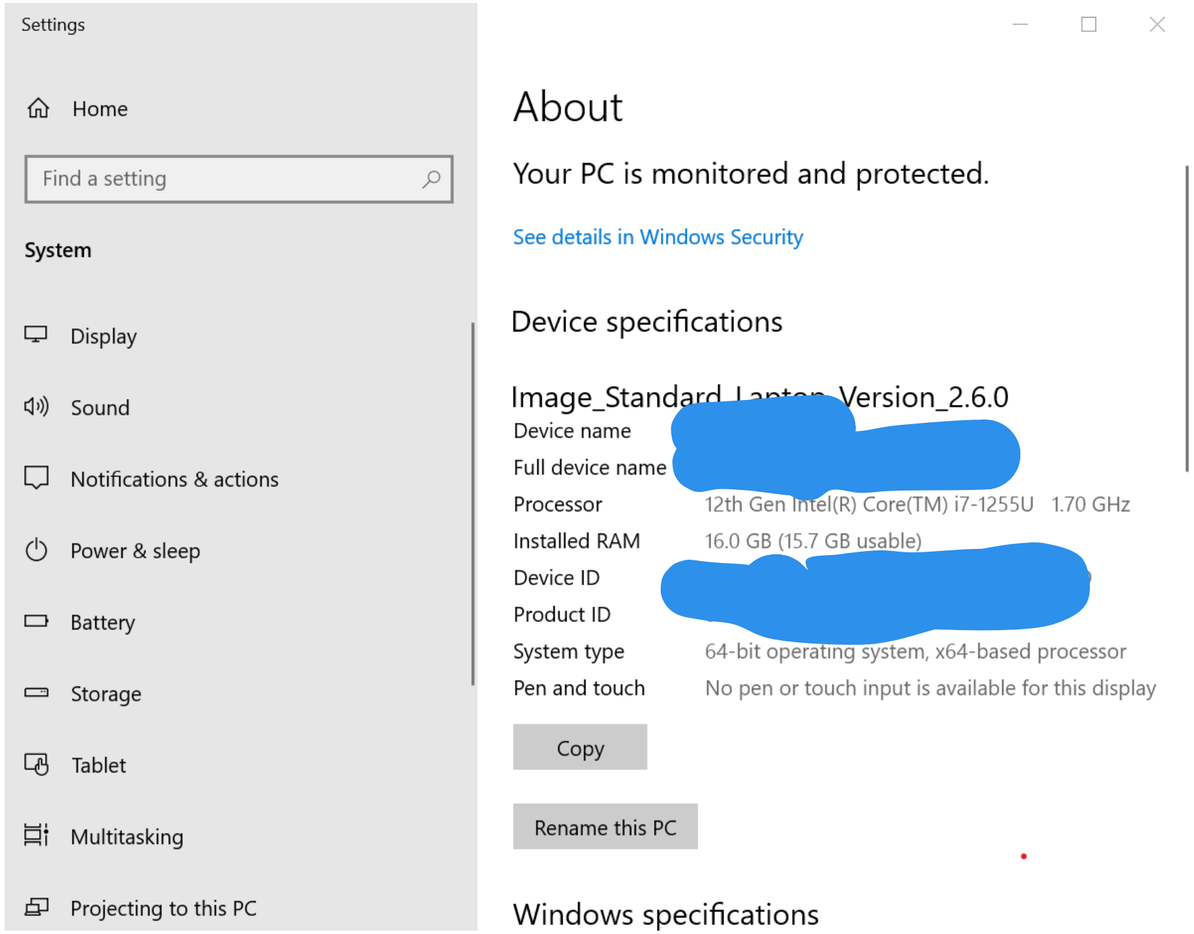
Ex.

if we have 7 digit

Number of operation is 2^7 = 128 operations

Decimal - Binary - Octal - Hex – ASCII Conversion Chart

Decimal	Binary	Octal	Hex	ASCII	Decimal	Binary	Octal	Hex	ASCII	Decimal	Binary	Octal	Hex	ASCII	Decimal	Binary	Octal	Hex	ASCII
0	00000000	000	00	NUL	32	00100000	040	20	SP	64	01000000	100	40	@	96	01100000	140	60	`
1	00000001	001	01	SOH	33	00100001	041	21	!	65	01000001	101	41	A	97	01100001	141	61	a
2	00000010	002	02	STX	34	00100010	042	22	"	66	01000010	102	42	B	98	01100010	142	62	b
3	00000011	003	03	ETX	35	00100011	043	23	#	67	01000011	103	43	C	99	01100011	143	63	c
4	00000100	004	04	EOT	36	00100100	044	24	$	68	01000100	104	44	D	100	01100100	144	64	d
5	00000101	005	05	ENQ	37	00100101	045	25	%	69	01000101	105	45	E	101	01100101	145	65	e
6	00000110	006	06	ACK	38	00100110	046	26	&	70	01000110	106	46	F	102	01100110	146	66	f
7	00000111	007	07	BEL	39	00100111	047	27	'	71	01000111	107	47	G	103	01100111	147	67	g
8	00001000	010	08	BS	40	00101000	050	28	(	72	01001000	110	48	H	104	01101000	150	68	h
9	00001001	011	09	HT	41	00101001	051	29	)	73	01001001	111	49	I	105	01101001	151	69	i
10	00001010	012	0A	LF	42	00101010	052	2A	*	74	01001010	112	4A	J	106	01101010	152	6A	j
11	00001011	013	0B	VT	43	00101011	053	2B	+	75	01001011	113	4B	K	107	01101011	153	6B	k
12	00001100	014	0C	FF	44	00101100	054	2C	,	76	01001100	114	4C	L	108	01101100	154	6C	l
13	00001101	015	0D	CR	45	00101101	055	2D	-	77	01001101	115	4D	M	109	01101101	155	6D	m
14	00001110	016	0E	SO	46	00101110	056	2E	.	78	01001110	116	4E	N	110	01101110	156	6E	n
15	00001111	017	0F	SI	47	00101111	057	2F	/	79	01001111	117	4F	O	111	01101111	157	6F	o
16	00010000	020	10	DLE	48	00110000	060	30	0	80	01010000	120	50	P	112	01110000	160	70	p
17	00010001	021	11	DC1	49	00110001	061	31	1	81	01010001	121	51	Q	113	01110001	161	71	q
18	00010010	022	12	DC2	50	00110010	062	32	2	82	01010010	122	52	R	114	01110010	162	72	r
19	00010011	023	13	DC3	51	00110011	063	33	3	83	01010011	123	53	S	115	01110011	163	73	s
20	00010100	024	14	DC4	52	00110100	064	34	4	84	01010100	124	54	T	116	01110100	164	74	t
21	00010101	025	15	NAK	53	00110101	065	35	5	85	01010101	125	55	U	117	01110101	165	75	u
22	00010110	026	16	SYN	54	00110110	066	36	6	86	01010110	126	56	V	118	01110110	166	76	v
23	00010111	027	17	ETB	55	00110111	067	37	7	87	01010111	127	57	W	119	01110111	167	77	w
24	00011000	030	18	CAN	56	00111000	070	38	8	88	01011000	130	58	X	120	01111000	170	78	x
25	00011001	031	19	EM	57	00111001	071	39	9	89	01011001	131	59	Y	121	01111001	171	79	y
26	00011010	032	1A	SUB	58	00111010	072	3A	:	90	01011010	132	5A	Z	122	01111010	172	7A	z
27	00011011	033	1B	ESC	59	00111011	073	3B	;	91	01011011	133	5B	[	123	01111011	173	7B	{
28	00011100	034	1C	FS	60	00111100	074	3C	<	92	01011100	134	5C	\	124	01111100	174	7C	|
29	00011101	035	1D	GS	61	00111101	075	3D	=	93	01011101	135	5D	]	125	01111101	175	7D	}
30	00011110	036	1E	RS	62	00111110	076	3E	>	94	01011110	136	5E	^	126	01111110	176	7E	~
31	00011111	037	1F	US	63	00111111	077	3F	?	95	01011111	137	5F	_	127	01111111	177	7F	DEL

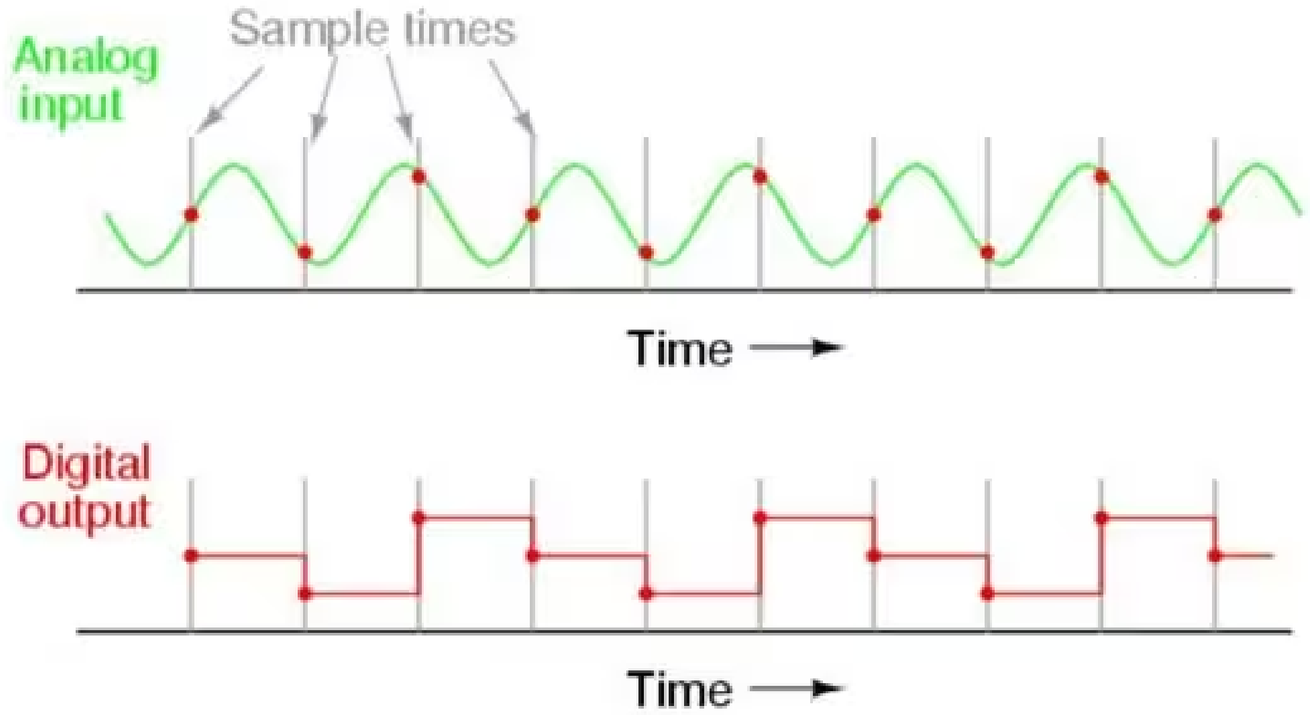


System type 64-bit operating system, x64-based processor

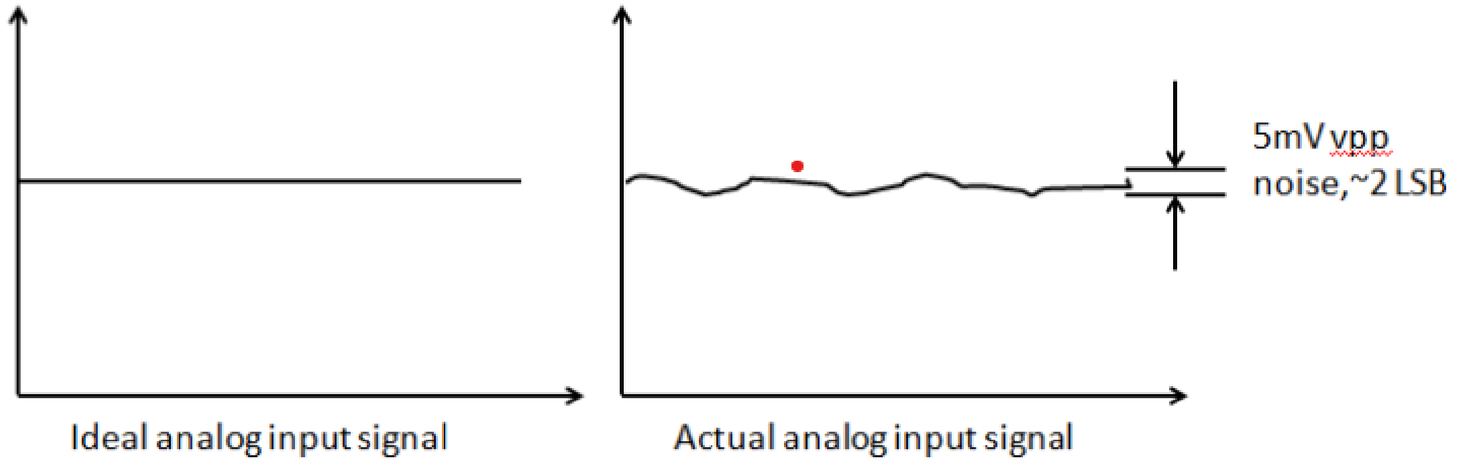
2^64 = 18,446,744,073,709,551,616 operations

Basic Concept of Binary Signal

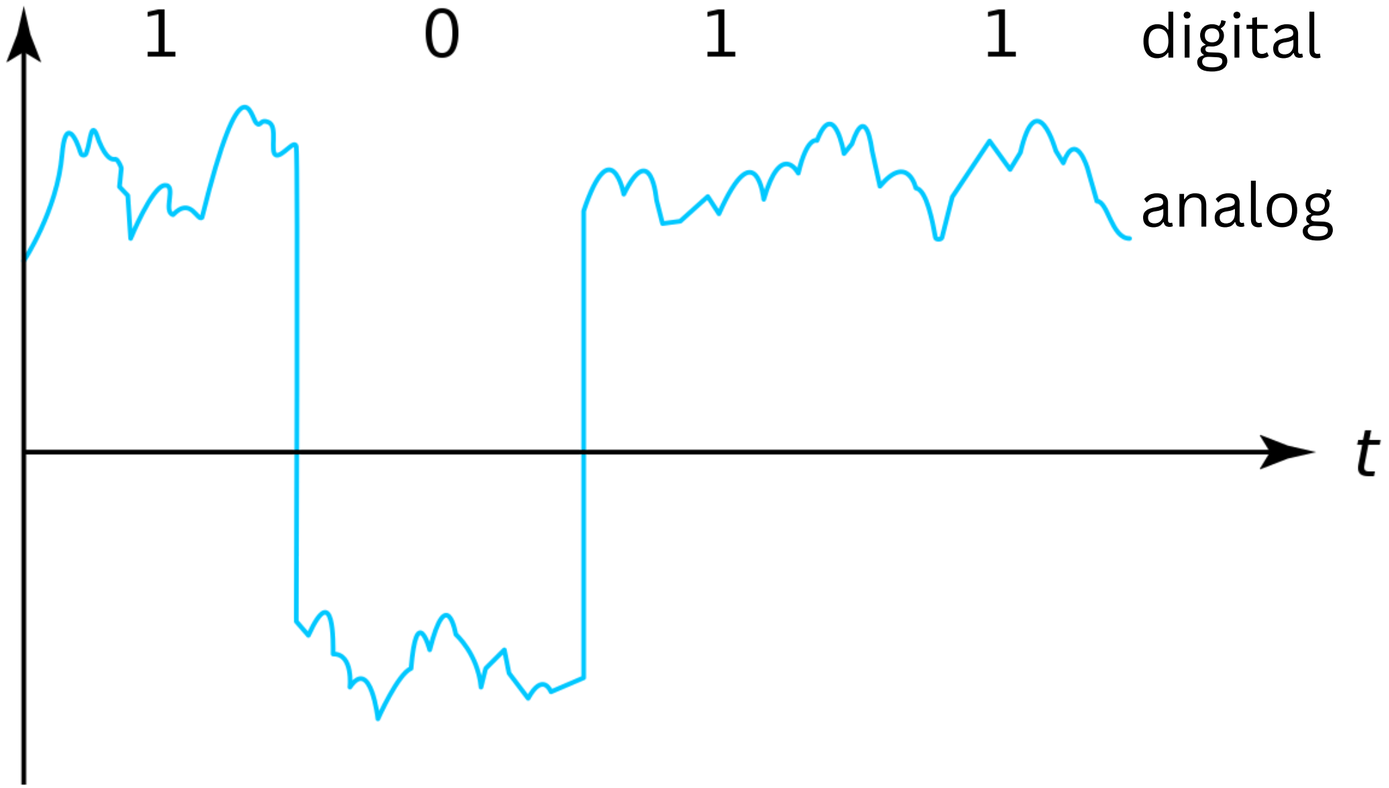
We send an electricity to sampling 0 and 1
low voltage is 0
high voltage is 1



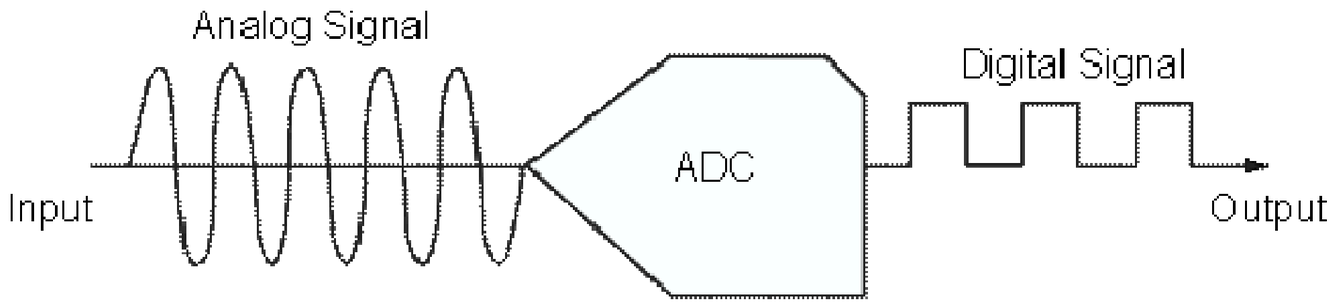
In the real world an electricity is not smoot line



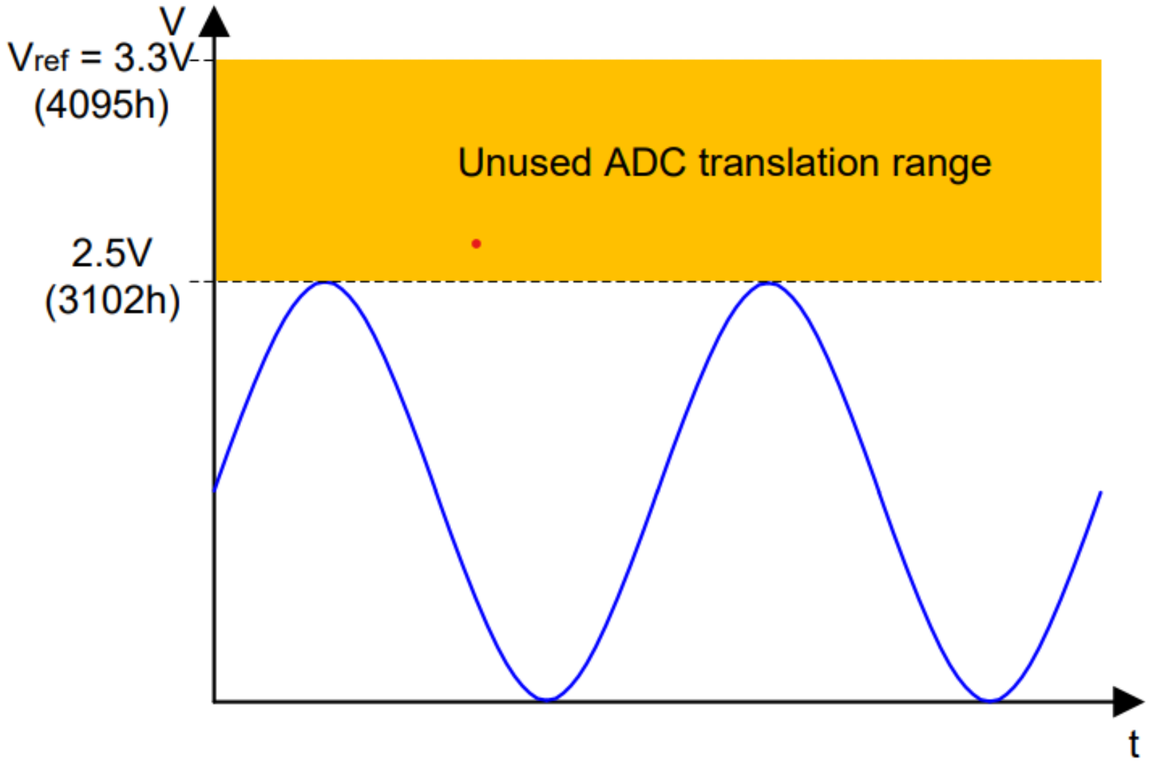
Digital vs Analog



We use Analog to Digital Convertor or ADC
to pass analog signal as input and receive digital signal as output
and then we apply digital signal to our objective.



In accidently situation such as lightning or sparking may cause of over voltage, we don't trust this information and reject the signal.



Basic Concept of Computer Architecture

Control Unit Process

Input > Memory Unit > ALU > Output

Input = Binary Code (0111010101)

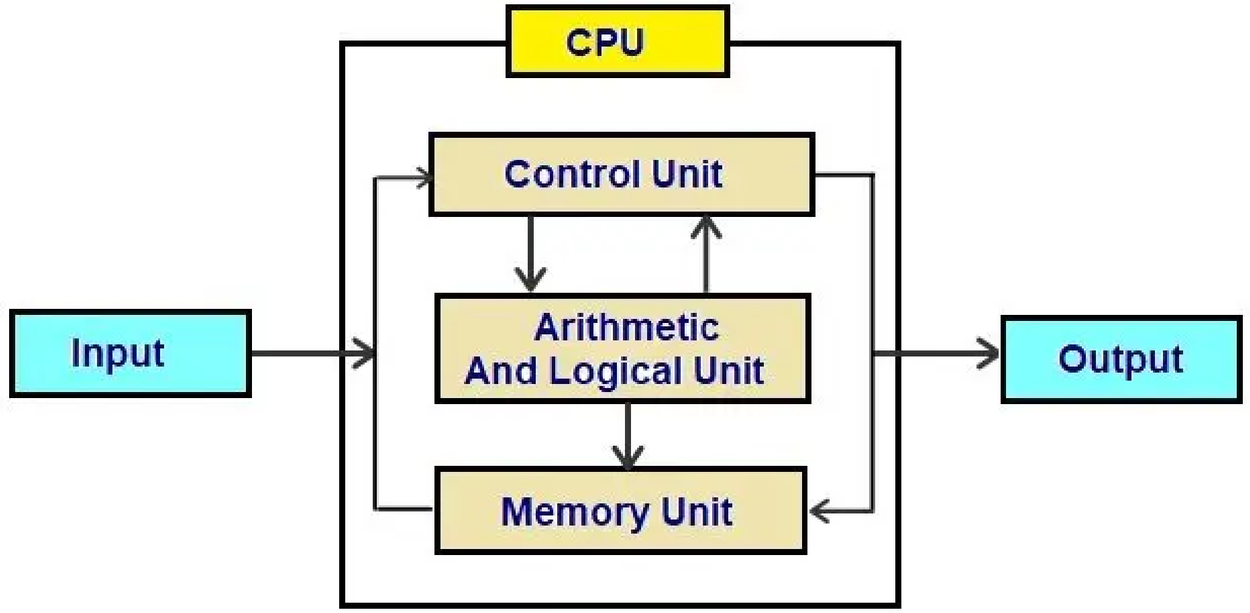
Mem = List of Binary Code

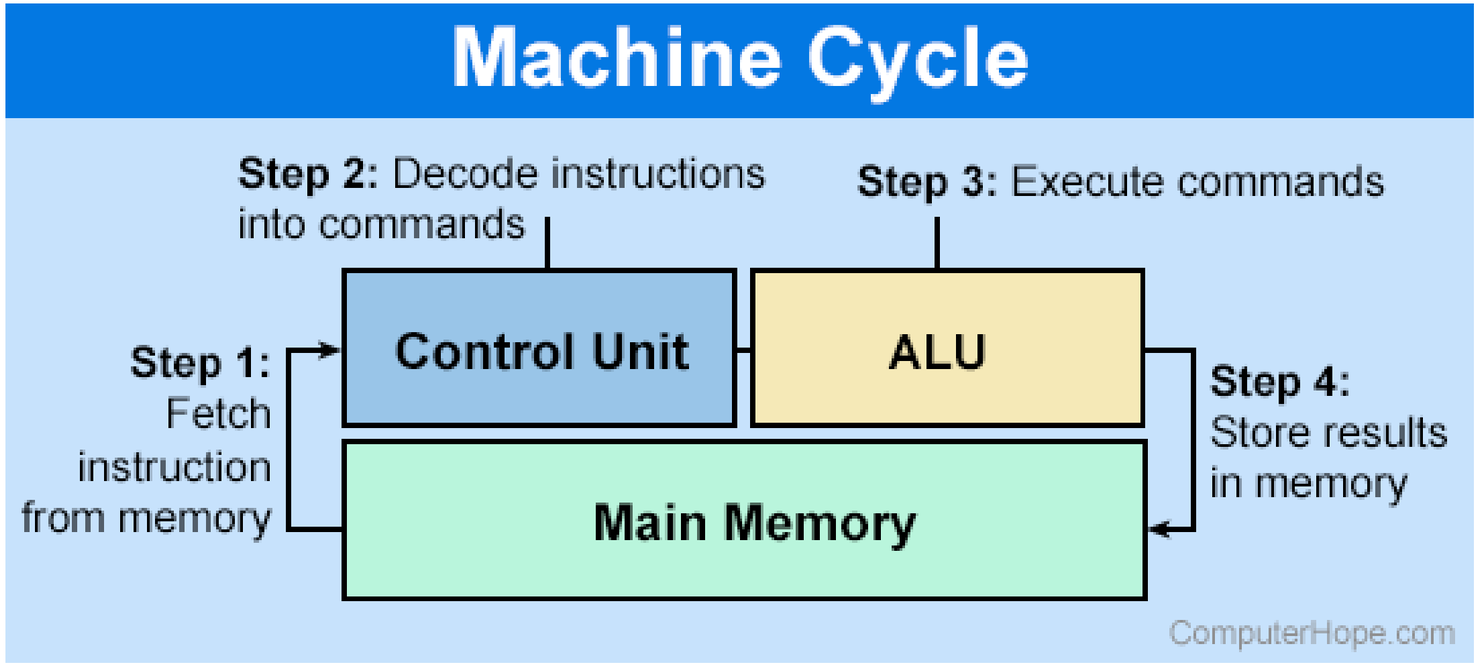
CU = Control Process

ALU = Computing Machine

Output = Action

Simple Computer




Machine Cycle
Step 2: Decode instructions into commands
Step 3: Execute commands
Step 1: Fetch instruction from memory
Control Unit
ALU
Step 4: Store results in memory
Main Memory
ComputerHope.com

Control Unit Process

Input > Memory Unit > Register > ALU > Output

Input = Binary Code (0111010101)

Mem = List of Binary Code

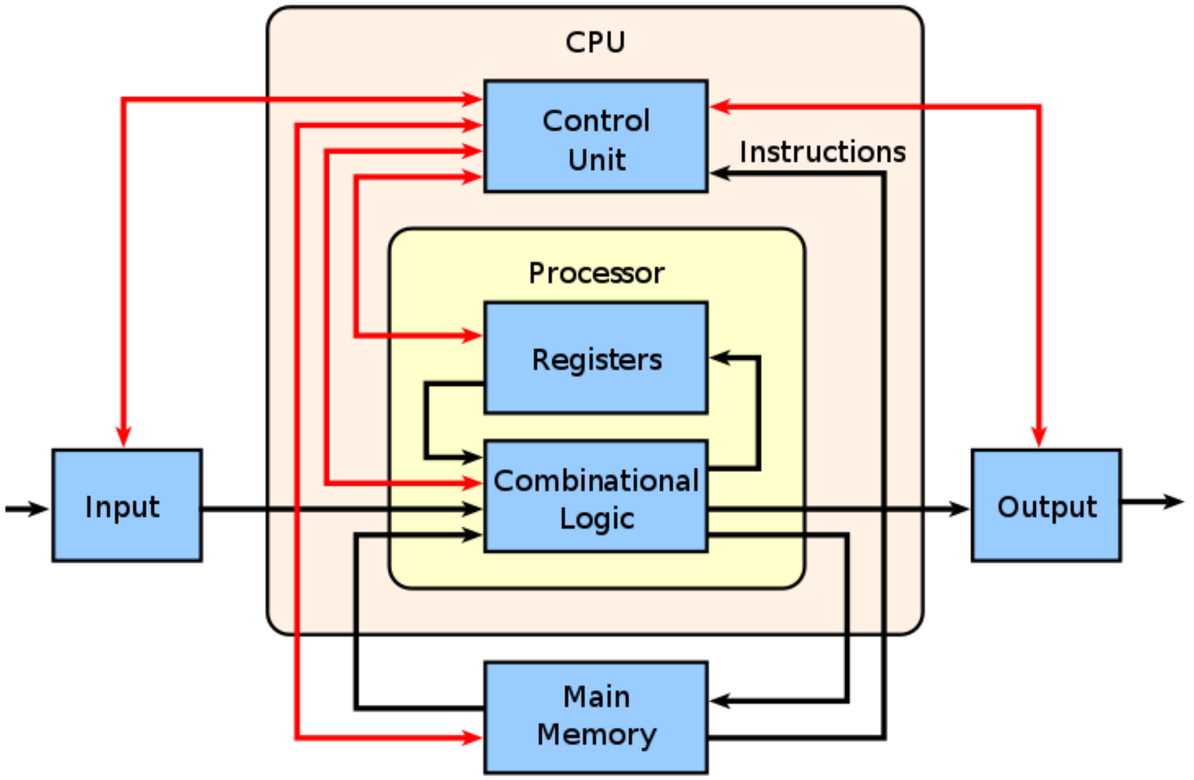
Register = Mem of CPU (for stored essential Data like time, instruction set)

CU = Control Process

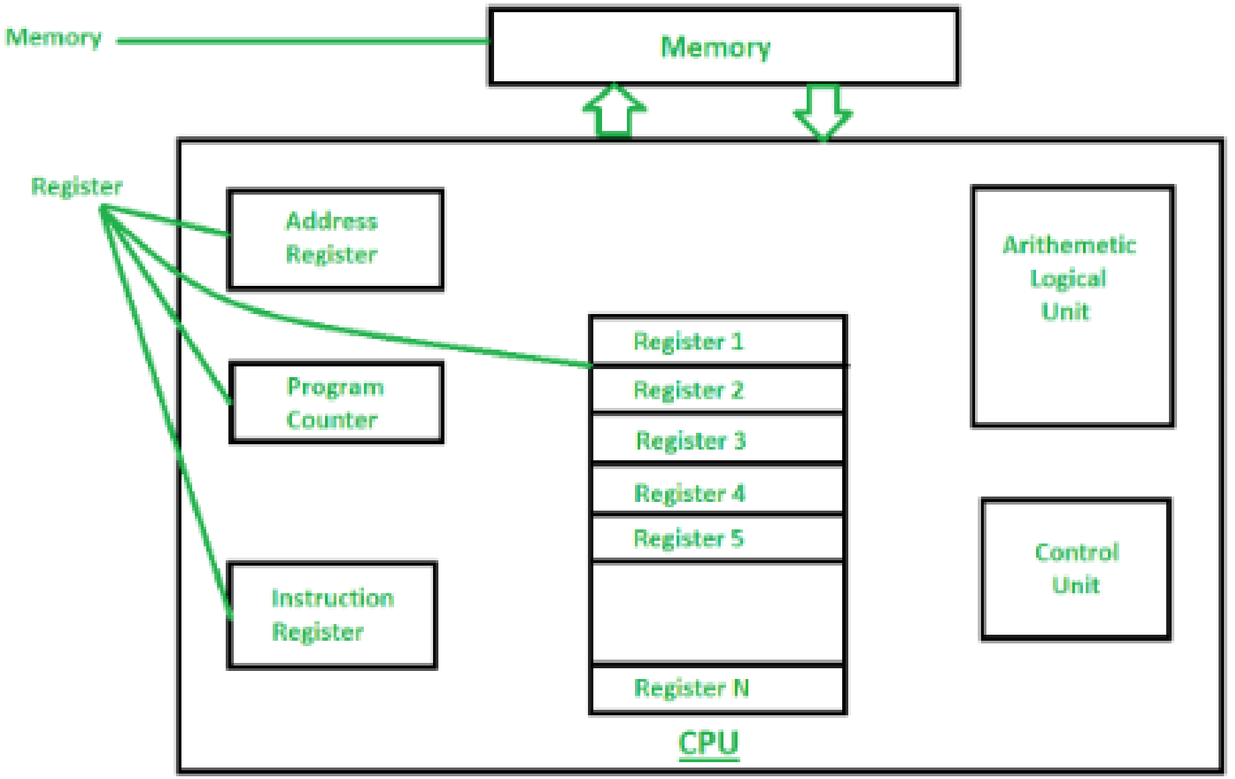
ALU = Computing Machine

Output = Action

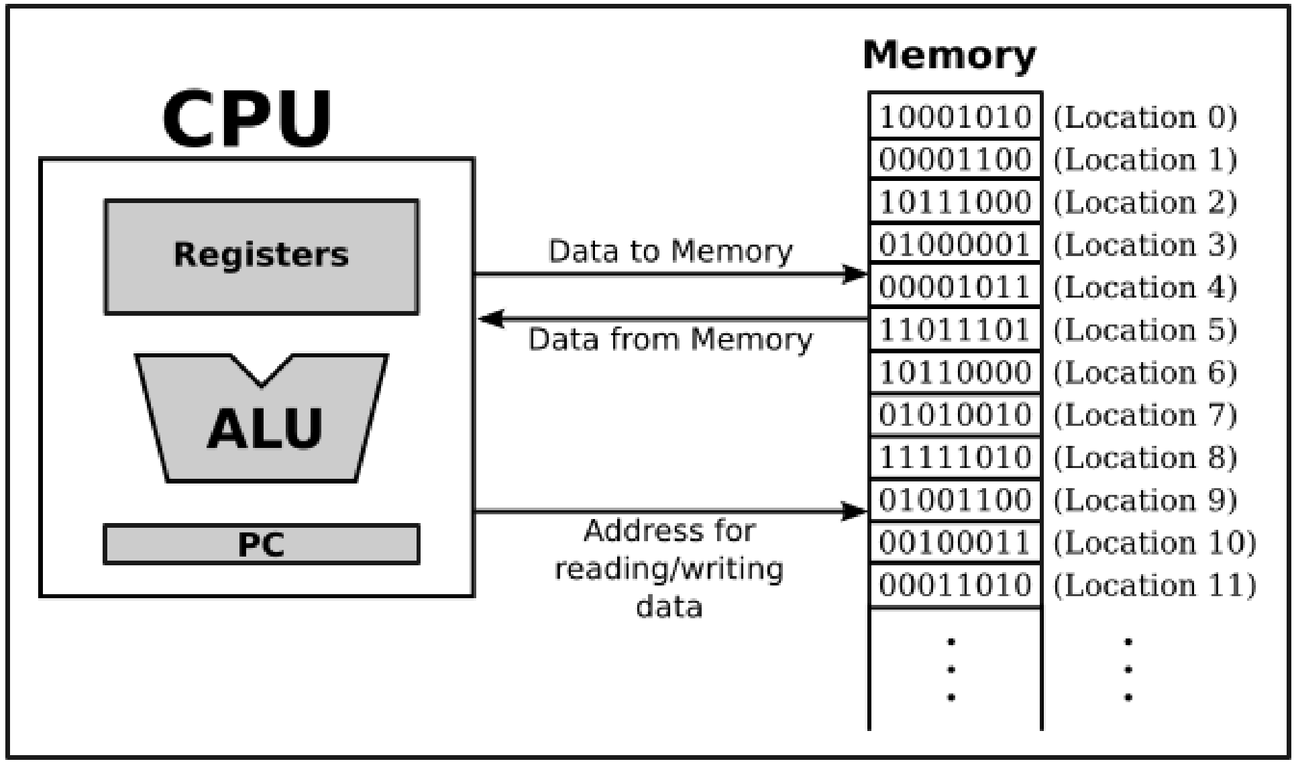
good computer



Example of common register



Mem and CPU communication

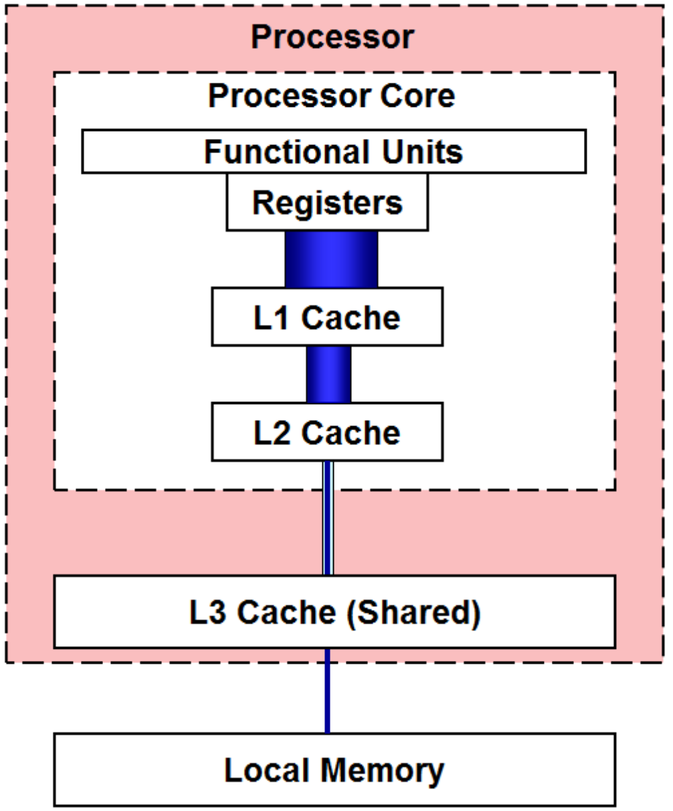


Control Unit Process

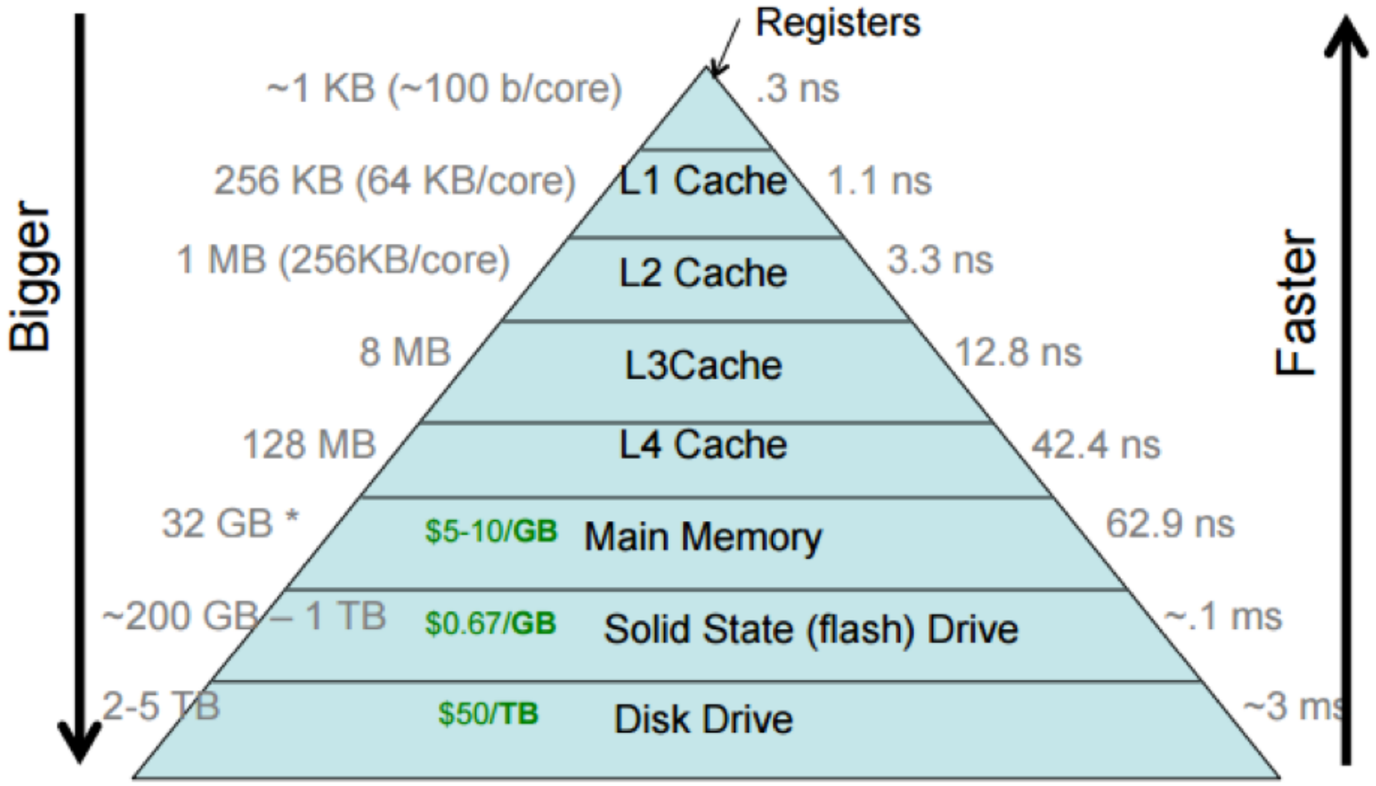
Input > Memory Unit > Cache > Register > ALU > Output

Input = Binary Code (0111010101)
Mem = List of Binary Code
Register = Mem of CPU (for stored essential Data like time, instruction set)
Cache = High Speed Mem
CU = Control Process
ALU = Computing Machine
Output = Action

best computer



All of Mem


Registers
~1 KB (~100 b/core)
.3 ns
256 KB (64 KB/core)
L1 Cache
1.1 ns
1 MB (256KB/core)
L2 Cache
3.3 ns
8 MB
L3Cache
12.8 ns
128 MB
L4 Cache
42.4 ns
32 GB *
$5-10/GB
Main Memory
62.9 ns
~200 GB – 1 TB
$0.67/GB
Solid State (flash) Drive
~.1 ms
2-5 TB
$50/TB
Disk Drive
~3 ms
Bigger
Faster

คุณสมบัติ Notebook Asus TUF Gaming A15 FA506ICB-HN103W (Graphite Black)

Brand	ASUS
Model	TUF Gaming A15 (FA506ICB-HN103W)
Processor	AMD Ryzen 7 4800H (2.9GHz up to 4.2GHz , 4MB L2 Cache / 8MB L3 Cache)
Chipset	N/A
CPU Brand	AMD
CPU Series	Ryzen 7
CPU Model Number	4800H
CPU Generation	4000 Series
Graphics	NVIDIA GeForce RTX 3050 (4GB GDDR6)
GPU Brand	NVIDIA

Processor	AMD Ryzen 7 4800H (2.9GHz up to 4.2GHz , 4MB L2 Cache / 8MB L3 Cache)