

ENGR 101

Engineering Technology

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Victoria
UNIVERSITY OF WELLINGTON
*Te Whare Wānanga
o te Ūpoko o te Ika a Māui*



CAPITAL CITY UNIVERSITY

Week 2 Lecture 1a

- Main topics
 - Introduction to Engineering Technology
 - Number system
 - Logic Gates
 - Boolean Algebra
- Course web page:
https://ecs.wgtn.ac.nz/Courses/XMUT101_2021T1/
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VICTORIA UNIVERSITY OF
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TE HERENGA WAKA

School of
Engineering and Computer Science

Te Kura Mātai Pūkaha, Pūrorohiko

↑ XMUT101 home

Course Outline

Lecture Schedule

Assignments and Labs

Submission

Moderation

Summary

[School of Engineering and Computer Science](#) > [Courses/XMUT101_2021T1](#) > [XMUT 101 Course Outline](#) > **LectureSchedule**

XMUT 101 Tentative Schedule

Lecture:	1 - 7 March	Lecture Slides	Video (Zip) files
1	Introduction to the course	Wk01Lec01a Wk01Lec01b	Wk01Lec01a.zip Wk01Lec01b.zip
2	Computer architecture. Computer data.	Wk01Lec02a Wk01Lec02b	Wk01Lec02a.zip Wk01Lec02b.zip
Lecture:	8 - 14 March		
1	Number systems: Decimal, binary and hexadecimal		
2			

Number system

- What is a **number system**?

Number system

- What is a **number system**?
 - A way or style of writing symbols to represent numbers.

Number system

- What is a **number system**?
 - A system of writing to represent numbers.
 - A mathematical notation for representing numbers of a given set.

Number system

- What is a **number system**?
 - A system of writing to represent numbers.
 - A mathematical notation for representing numbers of a given set.
 - Provides a unique representation of every number in the system

Number system

- The value of any digit in a number can be determined by:
 - the digit

Number system

- The value of any digit in a number can be determined by:
 - the digit
 - its position in the number

Number system

- The value of any digit in a number can be determined by:
 - the digit
 - its position in the number
 - the base of the number system

Types of Number system

- Four common types of number system
 1. Decimal number system
 2. Binary number system
 3. Octal number system
 4. Hexadecimal number system

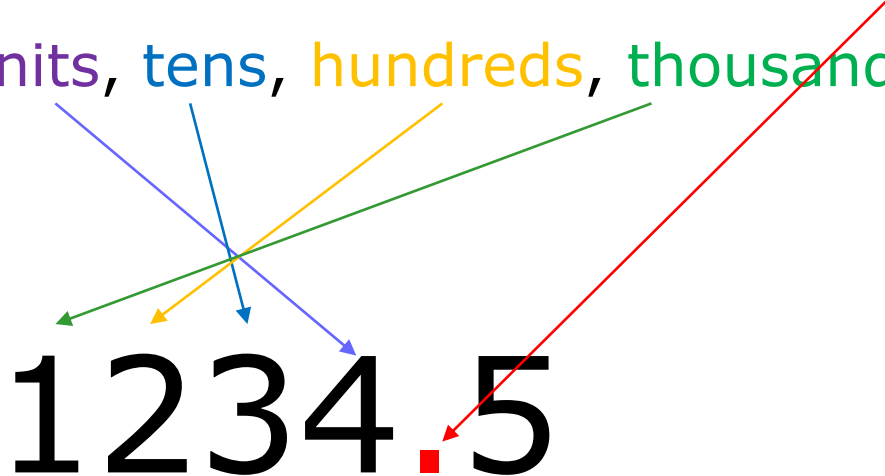
Decimal number system

- Base 10 number system
 - 10 digits
 - 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9

Decimal number system

- Base 10 number system
 - 10 digits
 - 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9
 - Positions successive to the left of the decimal point represent units, tens, hundreds, thousands and so on

Decimal number system

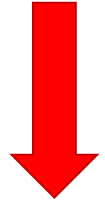
- Base 10 number system
 - 10 digits
 - 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9
 - Positions successive to the left of the **decimal point** represent **units**, **tens**, **hundreds**, **thousands** and so on
 - Example: 1234.5

Decimal number system

- Every position shows a particular power of the base (10)
- Example: 6789

Decimal number system

- Example: 6789
first digit last digit

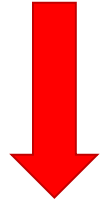


Row 1

	Thousands	Hundreds	Tens	Units

Decimal number system

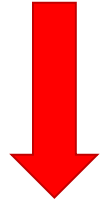
- Example: 6789
first digit last digit



	Thousands	Hundreds	Tens	Units
Row 2	3	2	1	0

Decimal number system

- Example: 6789
first digit last digit

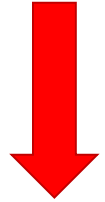


	Thousands	Hundreds	Tens	Units
Power	3	2	1	0
Base 10	10^3	10^2	10^1	10^0

Row 3

Decimal number system

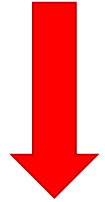
- Example: 6789



	Thousands	Hundreds	Tens	Units
Power	3	2	1	0
Base 10	10^3	10^2	10^1	10^0
Row 4 Example	6	7	8	9
	6×10^3	7×10^2	8×10^1	9×10^0
	6×1000	7×100	8×10	9×1
	6000	700	80	9

Decimal number system

- Example: 6789



	Thousands	Hundreds	Tens	Units
Power	3	2	1	0
Base 10	10^3	10^2	10^1	10^0
Example	6	7	8	9
	6×10^3	7×10^2	8×10^1	9×10^0
	6×1000	7×100	8×10	9×1
Row 7	6000	700	80	9

Binary number system

- Base 2 number system
 - 2 digits
 - 0 and 1

Binary number system

- Base 2 number system
 - 2 digits
 - 0 and 1
- Rewind – decimal (Base 10) number system
 - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,

Binary number system

- Base 2 number system
 - 2 digits
 - 0 and 1
- Rewind – decimal (Base 10) number system
 - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
 - 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,

Binary number system

- Base 2 number system
 - 2 digits
 - 0 and 1
- Rewind – decimal (Base 10) number system
 - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
 - 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,
 - 20, 21, 22, 23, 24, 25, 26, 27, 28, 29,...

Binary number system

- Rewind – decimal (Base 10) number system
 - 90, 91, 92, 93, 94, 95, 96, 97, 98, 99,
 - 100, 101, 102, 103, 104, 105, 106, 107, 108, 109,
 - 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, ...

Binary number system

- Rewind – decimal (Base 10) number system
 - 90, 91, 92, 93, 94, 95, 96, 97, 98, 99,
 - 100, 101, 102, 103, 104, 105, 106, 107, 108, 109,
 - 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, ...
- Binary number system
 - 0, 1, 10, 11, 100, 101, 110, 111,
 - 1000, 1001, 1010, 1011, 1100, 1101, 1111,
 - 10000, 10001, 10010, 10011, 10100, 10101, 10110,
 - 10111, 11000, 11001, 11010, 11011, 11100, 11101,

Octal number system

- Base 8 number system
 - 8 digits
 - 0, 1, 2, 3, 4, 5, 6, and 7

Hexadecimal number system

- Base 16 number system
 - 16 digits
 - 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F

Hexadecimal	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Week 2 Lecture 1a

- Four common types of number system
 - Decimal number system
 - Binary number system
 - Octal number system
 - Hexadecimal number system
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