Introduction to "Information and Communication Technologies". Properties and classification of ICTs, the main methods of keeping, processing and issues to information. The measurement of information. Boolean algebra. Construction of logic. Elements of electronics.

Information and communications technology (**ICT**) is an extended term for information technology) is an extended term for information technology (IT) which stresses the role of unified communications) is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications) is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications (telephone) is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications (telephonelines and wireless signals), computers as well as necessary enterprise **software**, **middleware**, **storage**, and **audio-visual systems**, which enable users to access, store, transmit, and manipulate information.

However, ICT has no universal definition, as "the concepts, **methods and applications involved in ICT** are constantly evolving on an almost daily basis." The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g. personal computers, digital television, email, robots. For clarity, Zuppo provided an ICT hierarchy where all levels of the hierarchy "contain some degree of commonality in that they are related to technologies that facilitate the transfer of information and various types of electronically mediated communications.". Skills Framework for the Information Age is one of many models for describing and managing competencies for ICT professionals for the 21st century.

Information, in its most restricted technical sense, is a sequence of symbols that can be interpreted as a message. Information can be recorded as signs, or transmitted as signals. Information is any kind of event that affects the state of a dynamic system. Conceptually, information is the message (utterance or expression) being conveyed. The meaning of this concept varies in different contexts. Moreover, the concept of information is closely related to notions of constraint, communication, control, data, form [*disambiguation needed*], instruction, knowledge, meaning, understanding, mental stimuli, pattern, perception, representation.

The word information derives from the Latin informare (in+ formare), meaning to give form, shape, or character to. It is therefore to be the formative principle of, or to imbue with some specific character or quality.

Binary Number: 10101_2

Calculating Decimal Equivalent:

Step	Binary Number	Decimal Number
Step 1	10101_2	$((1 \text{ x } 2^4) + (0 \text{ x } 2^3) + (1 \text{ x } 2^2) + (0 \text{ x } 2^1) + (1 \text{ x } 2^0))_{10}$
Step 2	10101_2	$(16 + 0 + 4 + 0 + 1)_{10}$
Step 3	10101_2	21_{10}

1 011 101,100 11 → 001 011 101,100 110 → $135{,}46_8$;

binary	000	001	010	011	100	101	110	111
octal	0	1	2	3	4	5	6	7

10 1111,1000 11 → 0010 1111,1000 1100 → $2F8C_{16}$;

binary	0000	0001	0010	0011	0100	0101	0110	0111
hexadecimal	0	1	2	3	4	5	6	7

binary	1000	1001	1010	1011	1100	1101	1110	1111
hexadecimal	8	9	A	B	C	D	E	F

Octal Number System

Characteristics

- Uses eight digits, 0, 1, 2, 3, 4, 5, 6, 7.
- Also called base 8 number system
- Each position in a octal number represents a 0 power of the base (8). Example 8^0
- Last position in a octal number represents a x power of the base (8). Example 8^x where x represents the last position - 1.

Example

Octal Number: 12570_8

Calculating Decimal Equivalent:

Step	Octal Number	Decimal Number
Step 1	12570_8	$((1 \text{ x } 8^4) + (2 \text{ x } 8^3) + (5 \text{ x } 8^2) + (7 \text{ x } 8^1) + (0 \text{ x } 8^0))_{10}$
Step 2	12570_8	$(4096 + 1024 + 320 + 56 + 0)_{10}$
Step 3	12570_8	5496_{10}

Hexadecimal Number System

Characteristics

- Uses 10 digits and 6 letters, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.
- Letters represents numbers starting from 10. A = 10. B = 11, C = 12, D = 13, E = 14, F = 15.
- Also called base 16 number system
- Each position in a hexadecimal number represents a 0 power of the base (16). Example 16^0
- Last position in a hexadecimal number represents a x power of the base (16). Example 16^x where x represents the last position - 1.

Example

Hexadecimal Number: $19FDE_{16}$

Calculating Decimal Equivalent:

Step	Binary Number	Decimal Number
Step 1	$19FDE_{16}$	$((1 \text{ x } 16^4) + (9 \text{ x } 16^3) + (F \text{ x } 16^2) + (D \text{ x } 16^1) + (E \text{ x } 16^0))_{10}$
Step 2	$19FDE_{16}$	$((1 \text{ x } 16^4) + (9 \text{ x } 16^3) + (15 \text{ x } 16^2) + (13 \text{ x } 16^1) + (14 \text{ x } 16^0))_{10}$
Step 3	$19FDE_{16}$	$(65536+ 36864 + 3840 + 208 + 14)_{10}$
Step 4	$19FDE_{16}$	106462_{10}

For other uses, see Boolean algebra (disambiguation).

In mathematics In mathematics and mathematical logic, **Boolean algebra** is the branch of algebra is the branch of algebra in which the values of the variables is the branch of algebra in which the values of the variables are the truth values *true* and *false*, usually denoted 1 and 0 respectively. Instead of elementary algebra, usually denoted 1 and 0 respectively. Instead of elementary algebra where the values of the variables are numbers, and the main operations are addition and multiplication, the main operations of Boolean algebra are the conjunction *and* denoted as $\wedge$, the disjunction *or* denoted as $\vee$, and the negation *not* denoted as. It is thus a formalism for describing logical relations in the same way that ordinary algebra describes numeric relations.

Boolean algebra was introduced by George Boole in his first book *The Mathematical Analysis of Logic* (1847), and set forth more fully in his *An Investigation of the Laws of Thought* (1854). According

to Huntington (1854). According

to Huntington, the term "Boolean algebra" was first suggested by Sheffer in 1913.

Boolean algebra has been fundamental in the development of digital electronics Boolean algebra has been fundamental in the development of digital electronics, and is provided for in all modern programming

инверсия		конъюнкция			дизъюнкция		
x	$\overline{x}$	x_1	x_2	$x_1 \cdot x_2$	x_1	x_2	$x_1 \vee x_2$
0	1	0	0	0	0	0	0
1	0	0	1	0	0	1	1
		1	0	0	1	0	1
		1	1	1	1	1	1