CIT292 - COMPUTER LABORATORY 1 SUMMARY

Our world is an _____world.
Analog

Our world is an analog world.
True

Measurements of the physical objects around us are never in discrete units, but rather in a _____ range.
Continuous

A single 0 or a single 1 is a _____or bit.
Binary digit

A bit, having either the value of 0 or 1 can represent only two things or two pieces of information. It is, therefore, necessary to group many bits together to represent more pieces of information. A string of n bits can represent 2n different pieces of information.

For example, a string of two bits results in the four combinations 00, 01, 10, and 11. Note that the use of binary numbers is just a form of representation for a string of bits.

BCD is the acronym for_____
Binary Coded Decimal

The decimal digit 4 has a greater value than the decimal digit 8 because ____
It is in the tenth position whereas the digit 8 is in the unit position

The decimal value of a binary number can be found just like for a decimal number except that we raise the base number 2 to a power rather than the base number 10 to a power. For example, the value for the decimal number 658 is 65810 = 6×102 + 5×101 + 8×100 = 600 + 50 + 8 = 65810

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Table 1.1(a) - Numbers from 0 to 15 in binary, octal, and hexadecimal.

Decimal	Binary	Octal	Hexadecimal
0	0000	0	0
1	0001	1	1
2	0010	2	2
3	0011	3	3
4	0100	4	4
5	0101	5	5
6	0110	6	6
7	0111	7	7
8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

Hexadecimal numbers require _____ different digit symbols
16

_____ is a means of encoding decimal numbers.
Binary Coded Decimal (BCD)

If each digit of a decimal number is represented by its binary equivalent, this produces a code called _____
Binary Coded Decimal

In a Boolean function the _____ operator is either denoted with a dot (.) or no symbol at all.
AND

In a Boolean function, the _____operator is denoted with a plus symbol (+).
OR

The NOT operator is also known as the _____
INVERTER

The operation of the AND, OR, and NOT logic operators can be formally described by using a _____
truth table

A _____ is a two-dimensional array where there is one column for each input and one column for each output (a circuit may have more than one output).
truth table

Table 1.1(b): Truth tables for the three basic logical operators: (a) AND; (b) OR; (c) NOT

x	y	F
0	0	0
0	1	0
1	0	0
1	1	1

(a)

x	y	F
0	0	0
0	1	1
1	0	1
1	1	1

(b)

x	F
0	1
1	0

(c)

George Boole developed a system of mathematical logic in _____
1854

____ developed a system of mathematical logic called Boolean algebra
George Boole

_____ showed that circuits built with binary switches can easily be described using Boolean algebra.
Claude Shannon

In_____, Claude Shannon showed that circuits built with binary switches can easily be described using Boolean algebra.
1938

A variable x is called a Boolean variable if x takes on only values in B

The dual of a logic expression is defined as one that is obtained by changing all + operators with • operators

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The _____ states that if a Boolean expression is true, then its dual is also true.
duality principle

Boolean Expressions are equivalent expressions of the logic state of _____
Gates

_____ are tables which are set to list the possible inputs and find their corresponding outputs.
Truth tables

By looking at a_____, one is able to know the output of any possible combination of inputs.
Truth table

The NOT gate, the OR gate and the AND gate are three main types of logic gates.

The rules for these operations may be summarized as follows:

OR	AND	NOT
$0+0=0$	$0.0=0$	$0'=1$
$0+1=1$	$0.1=0$	$1'=0$
$1+0=1$	$1.0=0$	
$1+0=1$	$1.1=1$	

_____ is a tool for the analysis and design of digital system.
Boolean algebra

Boolean theorem are rules that can help us to simplify logic expressions and _____
logic circuits

_____theorems are extremely useful in simplifying expressios in which a product or sum of variables is inverted.
DeMorgan's

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A _____ is a product term that contains all the variables used in a function.
Minterm

A _____ is a sum term that contains all the variables used in the function.
Maxterm

Any Boolean function that is expressed as a sum of minterms, or as a product of maxterms is said to be in its _____form.
Canonical

A Boolean function is said to be in a _____ if a sum-of-products expression or a product-of-sums expression has at least one term that is not a minterm or a maxterms
standard form

Boolean functions are expressed in terms of AND, OR, and NOT operations

_____are the actual physical implementations of the logical operators
Logic gates

The following are types of Logic Gates

- AND gate
- OR gate
- NOT gate

The NOT gate is also called the_____
INVERTER

The AND gate is a circuit that operates such that its output is high only when all its inputs are high.

A _____ is an electronic circuit/device which makes the logical decisions.
logic gate

_____ circuits are the class of digital circuits where the outputs of the circuit are dependent only on the current inputs.
Combinational

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_____ are circuits whose outputs are dependent on not only the current inputs, but also on all of the past inputs.
Sequential circuits

The _____method is an easy way for reducing an equation manually and is discussed in unit 5 of this module.
Karnaugh map

The Quine-McCluskey or tabulation method for reducing an equation is ideal for programming the computer.

A ____is just a graphical representation of a logic function's truth table where the minterms are grouped in such a way that it allows one to easily see which of the minterms can be combined.
Karnaugh Map (K-map)

The K-map is a 2-dimensional array of squares, each of which represents one minterm in the Boolean function.

A Karnaugh map (K-map for short) provides a simple and straightforward procedure for combining these product terms.

The term _____to refer to a rectangle of adjacent 1-minterms
subcube

A _____ is a subcube that is not contained within any other subcube.
prime implicant

A Karnaugh map (K-map for short) provides a simple and straightforward procedure for combining these product terms. A K-map is just a graphical representation of a logic function's truth table

_____ and flip-flops are the basic memory elements for storing information.
Latches

A single latch or flip-flop can store only _____ bit of information.
One

The simplest memory circuit is called is a _____

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bistable element

The simplest way to add extra inputs is to replace the two inverters with two NAND gates. This circuit is called an_____
SR latch

When two 1's are fed back to the inputs which produce a 0 at the outputs, this oscillating behaviour is called the _____
critical race

The SR latch is also known as a_____
gated SR latch

The circuit for the D latch is also known as a_____
gated D latch

The D latch with enable circuit is often referred to as a_____
transparent latch

There are basically _____ main types of flip-flops
Four

There are basically four main types of flip-flops: D, S-R, J-K, and T.

The most important memory element is the _____
flip-flop

Digital systems can operate either asynchronously or_____
Synchronously

If the slave latch is enabled when the clock is low it is referred to as a negative-edge-triggered flip-flop.

Basically, a master-slave flip-flop is a system of two flip-flops—one being designated as master and the other is the slave.

The resulting circuit when all the flip-flops are clocked synchronously is known as_____
synchronous counter

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The NOT gate, OR gate and AND gate are three main types of_____
logic gates

A____ is a product term that contains all the variables used in a function
Minterm

_____ is concerned with the interconnection of digital components and modules
Digital Logic

By looking at_____one is able to know the output of any possible combination
truth tables

_____are set to list the possible inputs and find their corresponding inputs
truth tables

Boolean_____ and variable are allowed to have only two possible values
Constants

Boolean_____ are rules that can help us simplify logic expressions
Theorem

A_____ is one whose output will change bits state simultaneously, without any ripple.
Synchronous counter

The term_____ implies the logical relationship between the inputs and the outputs.
Logic Function

In order to change the state for a bistable element, we need to add external inputs called_____ to the circuit
RS latch

SET-CLEAR latch can be called a_____
SET-RESET latch

The D-flip flop is also referred to as the_____

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Latch

The operation of an OR gate can be described as a Boolean_____
Addition

The 4-bit input encodes the binary representation of a_____ digit
Decimal

The acronym IEEE stands for_____
Institute of Electrical and Electronics Engineers

The universal measuring instrument used extensively in computer laboratory is the____
Cathode Ray Oscilloscope

The advantage sequential circuits have over combinational circuits is_____
Timing

The major differences in these flip-flop types are in the number of_____they have and how they change states
Inputs

The NAND gate is derived from an AND gate and_____ connected in series
Inverter

The Quine-McCluskey or tabulation method for reducing an equation is ideal for_____ the computer
Programming

The most universally used logic gate is the_____ gates
NAND

A single latch or flip-flop can store only_____ of information
1 bit

The expression for the AND gate output is written_____
A.B

The 4-bit input encodes the binary representation of a_____ digit

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Decimal

Larger subcubes require fewer_____ because of fewer variables in the product term
AND gates

There are basically four main types of flip-flops: D, S-R, J-K AND_____
T

The Karnaugh map method is an easy way for_____ an equation manually
Reducing
Hexadecimal numbers require_____ different digit symbols
16

The NOT gate is also known as the_____
Inverter

A_____ is an IC that can be programmed by the userto execute a complex logic function.
PLD

When the hours counter reaches 12, it will be reset to zero by the_____ gate
NAND

One basic piece of test equipment used in digital troubleshooting is the_____
Logic Probe

Whenever both data inpuits J and K are at 1, then the flip-flop can be said to be in a_____ state
Toggle

____ is a prime implicant that includes a 1-minterm that is not included in any other prime implicant
Essential prime implicant

____ gates are widely employed and can be used to make other logic gates
NAND

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A Boolean variable is a quantity that may, at different times, be equal to either____

0 or 1

A_____ is a term with either a single variable, or two or more variables ORed together

Sum term

The____ states that if a Boolean expression is true, then its dual is also true

duality principle

When several operators are used in the same expression, the precedence given to the operators are, from_____ to lowest

Highest

In electronic technology, GAL is a common acronym for_____

Generic Array Logic

The AND operation can be described as a Boolean_____

Multiplication

The AND gate output is equal to the AND product of the_____ inputs.

Logic

Whenever an_____ is present in a logic circuit diagram, its output expression is simply equal to the input expression with a bar over it

Inverter

The main disadvantage of asynchronous counters over synchronous is their_____ delay

Propaganda

_____is a method used in analysis and design of digital components or systems

Boolean algebra

Subcube is used to refer to a_____ of adjacent 1-minterms

Rectangle

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Larger subcubes require fewer_____ because of fewer variables in the product term
AND gates

The exclusive-OR gate can be constructed using AND, OR and_____ gate
NOT

The decimal number system is a_____ system
Positional

_____ is used as a graphical representation of truth table in digital logic
Karnaugh map

To convert a binary number to octal, we group the bits into groups of_____
Threes

_____ number can easily converted to an octal
Binary

The D latch with enable circuit is also known as_____
transparent latch

When a_____ is enabled, its state changes immediately when its input changes
Latch

A_____ is a product term that contains all the variables used in a function
Minterm

A_____ term is a term with either a single variable, or two or more variables
Product

Memory elements are made up of basic_____
Logic gates

_____ provides a simple and straightforward procedure for combining the product terms of Boolean equations

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K-maps

_____ that we make of the physical objects around us are never in discrete units, but rather in a continuous range.
Measurements

Measurements that we make of the physical objects around us are never in _____units, but rather in a continuous range.
discrete

Measurements that we make of the physical objects around us are never in discrete units, but rather in a _____range.
Continuous

A single 0 or a single 1 is then a _____
binary digit or bit

_____ circuits deal with binary values
Digital

Digital circuits deal with _____ values
Binary

Digital circuits deal with binary _____
values

BCD means_____
Binary Coded Decimal

The _____number system is a positional system
decimal

The _____ system is a positional system
decimal number

The decimal number system is a _____system
Positional

The decimal digit 4 has a greater value than the decimal digit 8 because_____

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It is in the tenth position whereas the digit 8 is in the unit position

The binary system is a _____system
base-2

When we count in decimal, we count from_____.
0 to 9

Converting a decimal number to its binary equivalent can be done by successively dividing the decimal number by _____ and keeping track of the remainder at each step.
2

_____ usually consist of a long string of bits.
Binary numbers

_____ numbers usually consist of a long string of bits.
Binary

Binary numbers usually consist of a ____string of bits.
long

Binary numbers usually consist of a long _____of bits.
string

Binary numbers usually consist of a long string of_____.
Bits

Octal is _____
base-8

Hexadecimal is _____
base-16

_____ numbers only use the digits from 0 to 7 for the eight different combinations.
Octal

_____ only use the digits from 0 to 7 for the eight different combinations.
Octal numbers

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Octal numbers only use the digits from _____ for the eight different combinations.
0 to 7

When counting in octal, the number after 7 is _____
10

To convert a _____number to octal, we simply group the bits into groups of threes starting from the right.
binary

To convert a binary number to_____, we simply group the bits into groups of threes starting from the right.
Octal

To convert a binary number to octal, we simply group the bits into groups of _____starting from the right.
Threes

To convert a binary number to octal, we simply group the bits into groups of threes starting from the_____.
Right

_____ numbers are treated basically the same way as octal numbers except with the appropriate changes to the base.
Hexadecimal

Hexadecimal (or hex for short) numbers use _____
base-16

Converting binary numbers to hexadecimal numbers involve grouping the bits into groups of _____
fours

_____ is a means of encoding decimal numbers.
Binary Coded Decimal (BCD)

Binary Coded Decimal (BCD) is a means of encoding _____ numbers.
Decimal

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If each digit of a decimal number is represented by its binary equivalent, this produces a code called_____.
BCD
Decimal digit can be as large as _____
9

The addition of two binary numbers is performed in exactly the same manner as the addition of decimal numbers.
True

The binary switch has _____ connections
three

The binary switch has three connections:_____
an input, an output, and a control for turning the switch on or off

_____ switches connected in series give rise to the logical AND operator.
Two

Two switches connected in series give rise to the logical _____operator.
AND

The operation of the AND, OR, and NOT logic operators can be formally described by using a _____
truth table

A _____ is a two-dimensional array where there is one column for each input and one column for each output (a circuit may have more than one output).
truth table

A truth table is a _____array where there is one column for each input and one column for each output (a circuit may have more than one output).
two-dimensional

Truth tables for the three basic logical operators:_____, OR, and NOT.
AND

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Truth tables for the three basic logical operators: AND, _____, and NOT.
OR

Truth tables for the three basic logical operators: AND, OR, and_____.
NOT

Using a _____ is one method to formally describe the operation of a circuit or function.
truth table

Using a truth table is one method to formally describe the operation of a_____.
circuit or function

Using a truth table is one method to formally describe the _____ of a circuit or function.
Operation

Another method to formally describe the operation of a circuit is by using _____or Boolean functions.
Boolean expressions

Another method to formally describe the operation of a circuit is by using Boolean expressions or_____.
Boolean functions

_____, in 1854, developed a system of mathematical logic
George Boole

George Boole, in_____, developed a system of mathematical logic, which we now call Boolean algebra.
1854

George Boole, in 1854, developed a system of mathematical logic called_____
Boolean algebra

_____, in 1938, showed that circuits built with binary switches can easily be described using Boolean algebra.
Claude Shannon

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Claude Shannon, in_____, showed that circuits built with binary switches can easily be described using Boolean algebra.
1938

A variable x is called a _____if x takes on only values in B, i.e. either 0 or 1.
Boolean variable

A variable x is called a _____variable if x takes on only values in B, i.e. either 0 or 1.
Boolean

Specifically, we define the _____of a logic expression as one that is obtained by changing all + operators with operators, and vice versa, and by changing all 0's with 1's, and vice versa.
dual

The _____ states that if a Boolean expression is true, then its dual is also true.
duality principle

The duality principle states that if a _____ expression is true, then its dual is also true.
Boolean

_____ are equivalent expressions of the logic state of gates.
Boolean Expressions

Boolean Expressions are equivalent expressions of the logic state of_____.
Gates

_____ are tables which are set to list the possible inputs and find their corresponding outputs.
Truth tables

The_____, the OR gate and the AND gate are three main types of logic gates.
NOT gate

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The NOT gate, the _____and the AND gate are three main types of logic gates.
OR gate

The NOT gate, the OR gate and the _____are three main types of logic gates.
AND gate

There are _____ main types of logic gates.
Three

_____ is a tool for the analysis and design of digital system.
Boolean algebra

Boolean algebra is a tool for the analysis and design of_____.
digital system

Boolean algebra is a tool for the analysis and design of _____system.
Digital

A _____ is a quantity that may, at different times, be equal to either 0 or 1.
Boolean variable

_____ are rules that can help us to simplify logic expressions and logic circuits
Boolean theorem

The inverse of a function is denoted by _____
F

A _____ is a term with either a single variable, or two or more variables ANDed together
product term

A_____ is a term with either a single variable, or two or more variables ORed together.
sum term

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A _____ is a product term that contains all the variables used in a function.
Minterm

A_____ is a sum term that contains all the variables used in the function.
Maxterm

Any Boolean function that is expressed as a sum of minterms, or as a product of maxterms is said to be in its_____.
canonical form

A Boolean function is said to be in a _____ if a sum-of-products expression or a product-of-sums expression has at least one term that is not a minterm or a maxterms respectively.
standard form

Sometimes, common variables in a standard form expression can be factored out. The resulting expression is no longer in a sum-of-products or product-of-sums format. These expressions are in a_____.
non-standard form

Complex Boolean equations can be simplified by a new kind of algebra popularly called _____
or Boolean algebra.
Switching Algebra

Complex Boolean equations can be simplified by a new kind of algebra popularly called Switching Algebra or_____.
Boolean algebra

As Boolean functions are expressed in terms of _____operations
AND, OR, and NOT

_____ are the actual physical implementations of the logical operators
Logic gates

The NOT gate is also called the _____
INVERTER

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Digital circuit diagrams are also called _____
schematic diagram or schematics

The AND gate output is equal to the AND product of the logic inputs.
True

For all other cases the AND gate output is low.
True

Whenever an INVERTER is present in a logic-circuit diagram_____
its output expression is simply equal to the input expression with a bar over it

If the operation of a circuit is defined by a Boolean expression_____
a logic-circuit diagram can be implemented directly from that expression

A _____ consists of logic gates, where outputs are at any instant and are determined only by the present combination of inputs without regard to previous inputs or previous state of outputs.
combinational circuit

The digital system consists of ____types of circuits
Two

The digital system consists of two types of circuits:_____ and_____
Combinational circuits and sequential circuits

_____ are the class of digital circuits where the outputs of the circuit are dependent only on the current inputs.
Combinational circuits

_____ circuits are the class of digital circuits where the outputs of the circuit are dependent only on the current inputs.
Combinational

A _____circuit is able to produce an output simply from knowing what the current input values are.
Combinational

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_____ are circuits whose outputs are dependent on not only the current inputs but also on all of the past inputs.
Sequential circuits

_____ circuits are circuits whose outputs are dependent on not only the current inputs but also on all of the past inputs.
Sequential

_____ is the reverse procedure of the analysis of combinational circuits.
Synthesis of combinational circuits

The _____ method is an easy way for reducing an equation manually
Karnaugh map

The _____ or tabulation method for reducing an equation is ideal for programming the computer.
Quine-McCluskey

The Quine-McCluskey or _____ method for reducing an equation is ideal for programming the computer.
Tabulation

The complexity of digital logic gates to implement a Boolean function is directly related to the complexity of algebraic expression.
True

Boolean functions may be simplified or minimized by _____ means
Algebraic

The map method was first proposed by_____
Veitch

The _____ provides a simple, straightforward procedure for the simplification of Boolean functions.
map method

The _____ or Karnaugh map may be regarded either as a pictorial representation of a truth table or as an extension of the Venn diagram.
Veitch diagram

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The Veitch diagram or _____ may be regarded either as a pictorial representation of a truth table or as an extension of the Venn diagram.
Karnaugh map

Karnaugh map may be regarded either as a pictorial representation of a truth table or as an extension of the_____.
Venn diagram

Karnaugh map may be regarded either as a _____ representation of a truth table or as an extension of the Venn diagram
pictorial

A _____ is just a graphical representation of a logic function's truth table
Karnaugh Map (K-map)

A Karnaugh Map (K-map) is just a _____ representation of a logic function's truth table
graphical

A _____ Map (K-map) is just a graphical representation of a logic function's truth table
Karnaugh

A Karnaugh Map (K-map) is just a graphical representation of a logic function's _____
truth table

The K-map is a 2-dimensional array of squares, each of which represents one _____in the Boolean function.
minterm

The _____ is a 2-dimensional array of squares, each of which represents one minterm in the Boolean function.
K-map

A _____(K-map for short) provides a simple and straightforward procedure for combining these product terms.
Karnaugh map

The term _____ is used to refer to a rectangle of adjacent 1-minterms.

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Subcube

1-minterm all by itself is called a _____
0-subcube

two adjacent 1-minterms is called a _____
1-subcube

A _____ will have four adjacent 1-minterms
2-subcube

A 2-subcube will have _____ adjacent 1-minterms
Four

The _____ reduces a Boolean function from its canonical form to its standard form.
K-map method

The goal for the Kmap method is_____
to find as few subcubes as possible to cover all of the 1-minterms in the given function

By definition, a _____ is a subcube that is not contained within any other subcube
prime implicant

By definition, an _____is a prime implicant that includes a 1- minterm that is not included in any other prime implicant.
essential prime implicant

_____ and flip-flops are the basic memory elements for storing information.
Latches

Latches and _____ are the basic memory elements for storing information.
flip-flops
_____ are the basic memory elements for storing information.
Latches and flip-flops

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The bit of information that is stored in a latch or flip-flop is referred to as the _____of the latch or flip-flop.
State

The solution is to connect two inverters in series, as shown in Figure 2.1(a). This circuit is called a _____
bistable element

The simplest way to add extra inputs is to replace the two inverters with two NAND gates, as shown in (a) of Figure 2.1(b). This circuit is called an_____.
SR latch

The SR latch with enable is also known as a _____
gated SR latch

The circuit for the D latch with enable is also known as a _____
gated D latch

The D latch with enable circuit is often referred to as a_____.
transparent latch

The logic circuits whose outputs at any instant of time depend only on the input signals present at that time are known as_____.
combinational circuits

The logic circuits whose outputs at any instant of time depend on the present inputs as well as on the past outputs are called_____.
sequential circuits

In _____ circuits, the output signals are fed back to the input side.
Sequential

A CLEAR input can also be called _____
RESET input

A SET-CLEAR latch can be called a _____
SET-RESET latch

There are basically _____main types of flip-flops

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four

There are basically four main types of flip-flops: D, S-R, J-K, and T.

The action of clearing a Flip-Flop or a latch is also called _____
resetting

The most important memory element is the_____, which is made up of an assembly of logic gates.
flip-flop

The Q output is called the _____
normal flip-flop output

An _____ has two inputs named Set (S) and Reset (R), and two outputs Q and Q'.
S-R flip-flop

A condition that cannot be controlled and predicted it is called the_____
indeterminate condition

A flip-flop is also known as a_____.
bistable multivibrator

Flip-flops can be obtained by using _____ gates
NAND or NOR

Generally, _____ circuits change their states only when clock pulses are present.
Synchronous

_____ can operate either asynchronously or synchronously.
Digital systems

_____ systems can operate either asynchronously or synchronously.
Digital

Digital systems can operate either _____or synchronously.
asynchronously

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Digital systems can operate either asynchronously or_____.
Synchronously

In _____ systems, the outputs of logic circuits can change state any time one or more of the inputs change.
asynchronous

In _____ systems, the exact times at which any output can change states is determined by a signal commonly called the clock.
Synchronous

The _____ is generally a rectangular pulse train or squarewave.
clock signal

The _____ signal is generally a rectangular pulse train or squarewave.
clock

The clock signal is generally a _____ pulse train or squarewave.
rectangular

The clock signal is generally a rectangular pulse train or_____.
squarewave

The _____ signal is distributed to all parts of the system, and most (if not all) of the system outputs can change state only when the clock makes a transition.
Clock

When the clock changes from a 0 to a 1, this is called _____
positive-going transition (PGT)

When the clock goes from 1 to 0, this is called the _____
negative-going transition (NGT)

Most digital systems are principally _____
synchronous

Most digital systems are principally synchronous
True

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If the slave latch is enabled when the clock is low (i.e., with the inverter output connected to the E of the slave latch), then it is referred to as a_____.
negative-edge-triggered flip-flop

A _____flip-flop is a system of two flip-flops—one being designated as master and the other is the slave.
master-slave

_____ , as the name suggests, are for counting a sequence of values.
Counters

The modified adder that only adds one operand with the carry-in is called a _____
half adder (HA)

The _____up counter counts from 0 to 9 and then cycles back to 0.
binary coded decimal (BCD)

_____ counters are counter circuits made from cascaded J-K flip-flops where each clock input receives its pulses from the output of the previous flip-flop invariably exhibit a ripple effect, where false output counts are generated between some steps of the count sequence.
Asynchronous or ripple

As the signal propagates through the counter in a ripple fashion, it is called a_____.
ripple counter

In _____counters, each flip-flop is triggered by the previous flip-flop, and hence the speed of operation is limited.
Asynchronous

Down counters are not as widely used as up counters.
True

A _____counter is one whose output bits change state simultaneously, with no ripple.
Synchronous

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The resulting circuit is known as a_____.
synchronous counter

A synchronous counter can operate at a much higher input frequency than an asynchronous counter with the same number of flip-flops.
True

Within the context of computer laboratory, the bistable element has ____ symmetrical nodes
Two

The action of clearing a Flip-Flop is also called ____.
Resetting

The most important memory element is the ____.
flip-flop

_____ systems can operate either asynchronously or synchronously.
Digital

_____ systems, the outputs of logic circuits can change state any time one or more of the inputs change.
Asynchronous

____ is edge-triggered.
flip-flop

At every active edge of the clock, the _____ flip-flop will load in a new value.
D

If the two inputs J and K of a J-K flip-flop are tied together it is referred to as a ____ flip-flop.
T

The T in the T flip-flop stands for _____.
Toggle

_____ counter is the simplest counter.
modulo-n

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In _____ counter, the sequence starts with a string of 0 bits followed by one 1-bit
Ring

In _____ counter, sequence is coded so that any two consecutive values must differ in only one bit.
gray-code

In _____ counter, the range is from 0 to 2n – 1 and back to 0
n-bit binary

In _____ counter, the sequence is always from 0 to 9.
BCD

Modified adder that only adds one operand with the carry-in is called a ____ adder.
Half

The _____ number of a counter is always equal to the number of states which the counter goes through in each complete cycle before it recycles back to its starting state
MOD

An n-bit binary counter has discrete states from 0 to _____.
2n-1

In _____ circuits, the output signals are fed back to the input side.
Sequential

Latches and Flip-flops are the building blocks of ____ circuits.
Sequential

Asynchronous counters are counter circuits made from cascaded ____ flip-flops where each clock input receives its pulses from the output of the previous flip-flop.
J-K

To construct an accurate digital clock, a very highly controlled basic clock _____ is required.

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Frequency

A parallel down-counter can be made to count down by using the ____ outputs of flip-flops to feed the various logic gates.
Inverted

_____ flip-flops are required for a counter that has to count as many as one thousand items.
10

An n-bit binary counter repeats the counting sequence for every ____ clock pulses.
2n

A _____ is NOT level-sensitive.
Flip-flop

The _____ adder adds two operands plus the carry
Full

The _____ signal is generally a rectangular pulse train or squarewave.
Clock

A CLEAR input can also be called _____ input
RESET

In _____ systems, the exact times at which any output can change states is determined by a signal commonly called the clock.
Synchronous

A _____ flip-flop is a very good option to use in counter design and in sequential circuits design where switching an operation is required
T

For battery-operated digital watches the basic frequency can be obtained from a quartz-crystal _____.
Oscillator

A sum term that contains all the variables used in the function is a _____

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Maxterm

A string of 4 bits will result in_____ different combinations.
16

The term_____ refers to a rectangle of adjacent 1-minterms
Subcube

A _____ term is a term with variable(s) ORed together
Sum

The dual of the logic expression (x • y'+ z) • (x + 1) is _____
(x + y'• z) + (x • 0)

Digital clocks operated from the AC power line can use the _____ Hz power frequency as the basic clock frequency
50

In a _____ counter, all the Flip-flops will change states simultaneously
parallel

In ____ counter, the propagation delays of the flip-flops do NOT add together to produce the overall delay
asynchronous
The total _____ time of a synchronous counter is the time it takes one flip-flop to toggle plus the time for the new logic levels to propagate through a single AND gate to reach the J, K inputs
delay

_____ counters can operate at a much higher input frequency than _____ counters with the same number of flip-flops
synchronous, asynchronous respectively

Ability to operate at higher frequencies is the major advantage of _____ counters.
asynchronous

A Boolean function is said to be in a _____ form if a sum-of-products expression or a product-of-sums expression has at least one term that is NOT a minterm or a maxterms respectively

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standard

By reducing the _____ size, we will improve on speed and power consumption.
gate

The K-map is a ____-dimensional array of squares, each of which represents one minterm in the Boolean function
1

The K-map for an n-variable function is an array with _____squares.
2

_____ are the basic memory elements for storing information.
Latches and sequential circuits

Which of the following flip-flops cannot result in more complex design when used in building counter circuit?
D

The _____ counter is the simplest to build.
ripple

The problems encountered with _____ counters are caused by the accumulated Flip-flop propagation delays.
asynchronous

(x • y)' = x' + y' is_____ theorem in Boolean algebra.
DeMorgan's

A _____ changes state only at the active edge of its enable signal
flip-flop

The simplest way to add extra inputs to the circuit of the bistable element is to replace the inverters with _____ gates.
NAND

Basically, there are _____ main types of flip-flops.
three

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____ are used more often than _____.
flip-flops, latches respectively

In order to change the state for the bistable element, there is need to add ____ inputs to the circuit.
internal

When we replace the inverters in bistable element with another gates we get the _____.
S-R latch

Which of the following is NOT a type of counter?
Binary Up

x • x + y) = x is _____ theorem in Boolean algebra.
associative

100100111112 is _____ in octal.
44738

Any Boolean function that is expressed as a sum of minterms is said to be in it's_____ form.
Productterm

_____ is the simplest memory circuit.
Inverter

The _____ counter is simple and straightforward in operation and construction and usually requires minimum amount of hardware.
Asynchronous

Which of the following statements is NOT true?
Octal numbers only use the digits from 0 to 8

Two switches connected in series give rise to the logical_____ operator.
NOT

A binary switch has_____ connections
One

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The largest_____ is known as a prime implicant.
Subrect

If two switches are connected in parallel, then _____ switch(es) need to be on in order for the output F to be a 1
three

The_____ is sensitive to its inputs all the time.
S-R flip-flop

A Karnaugh Map (K-map) is just a _____ representation of a logic function's truth table.
Visual

The difference between a flip-flop & latch is _____.
Latches has two inputs but flip-flop has two

The characteristic equation of S-R latch is _____.
Q(n+1) = (S + Q(n))R'

The NAND latch works when both inputs are _____.
1

The outputs of SR latch are _____.
q and q'

The SR latch consists of _____
2 inputs

Which of the following statements apply to CMOS devices?
All of the options

What are the major differences between the 5400 and 7400 series of ICs?
The 5400 series are military grade and allow for a wider range of supply voltages and temperatures

What causes low-power Schottky TTL to use less power than the 74XX series TTL?
A larger value resistor

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What must be done to interface TTL to CMOS?
A pull-up resistor must be used between the TTL output-CMOS input node and Vcc; the value of RP will depend on the number of CMOS gates connected to the node

How many full adders are required to construct an m-bit parallel adder?
m-1

An OR gate can be imagined as _____
Switches connected in parallel

Which of the following gate is known as coincidence detector?
AND gate

The time required for a gate or inverter to change its state is called _____.
Propagation time

In which of the following gates the output is 1 if and only if at least one input is 1?
OR

The output of an EX-NOR gate is 1. Which input combination is correct?
A = 0, B = 0

Entries known as _____ mapping.
Diagonal

In case of XOR/XNOR simplification we have to look for the following_____
Both diagonal and offset adjencies

These logic gates are widely used in ____ design and therefore are available in IC form.
Digital

There are many situations in logic design in which simplification of logic expression is possible in terms of XOR and __ operations.
X-NOR

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There are _____ cells in a 4-variable K-map.
16

A Karnaugh map (K-map) is an abstract form of ____ diagram organized as a matrix of squares.
Venn Diagram

_____ expressions can be implemented using either (1) 2-level AND-OR logic circuits or (2) 2-level NAND logic circuits.
SOP

There are _____ Minterms for 3 variables (a, b, c).
8

Canonical form is a unique way of representing_____.
Boolean Expressions

(170)base10 is equivalent to _____base16.
(AA)base16

Convert the hexadecimal number (1E2)base16 to decimal: _____.
482

The octal equivalent of the decimal number (417)base10 is _____
(641)base8

The octal number (651.124)base8 is equivalent to _____ base 16.
(1A9.2A)base 16

The given hexadecimal number (1E.53)base16 is equivalent to _____ base 8 .
(36.246)base 8

How many types of flip-flops do we have?
4

There are _____ cells in a 4-variable K-map.
16

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Venn Diagram

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8

Canonical form is a unique way of representing _____.
Boolean Expressions

The NOT gate, OR gate and AND gate are three main types of_____
logic gates

A_____ is a product term that contains all the variables used in a function
Minterm

_____ is concerned with the interconnection of digital components and modules
Digital Logic

By looking at_____ one is able to know the output of any possible combination
truth tables

_____are set to list the possible inputs and find their corresponding inputs
truth tables

Boolean_____ and variable are allowed to have only two possible values
Constants

Boolean_____ are rules that can help us simpilfy logic expressions
Theorem

A_____ is one whose output will change bits state simultaneously, without any ripple.
Synchronous counter

The term_____ implies the logical relationship between the inputs and the outputs.
Logic Function

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In order to change the state for a bistable element, we need to add external inputs called_____ to the circuit
RS latch

SET-CLEAR latch can be called a_____
SET-RESET latch

The D-flip flop is also referred to as the_____
Latch

The operation of an OR gate can be described as a Boolean_____
Addition

The 4-bit input encodes the binary representation of a_____digit
Decimal

The acronym (IEEE) stands for_____
Institute of Electrical and Electronics Engineers

The universal measuring instrument used extensively in computer laboratory is the_____
Cathode Ray Oscilloscope

The advantage sequential circuits, have over combinational circuits is____
Timing

The major differences in these flip-flop types are in the number of_____ __they have and how they change states
Inputs

The NAND gate is derived from an AND gate and_____connected in series
Inverter

The Quine-McCluskey or tabulation method for reducing an equation is ideal for_____ the computer
Programming

The most universally used logic gate is the_____ gates
NAND

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In electronic technology, GAL is a common acronym for_____
Generic Array Logic

The AND gate output is equal to the AND product of the_____inputs.
Logic

Whenever an_____is present in a logic circuit diagram, its output expression is simply equal to the input expression with a bar over it
Inverter

The main disadvantage of asynchronous counters over synchronous is their_____delay
Propaganda

_____ is a method used in analysis and design of digital components or systems
Boolean algebra

_____is used as a graphical representation of truth table in digital logic
Karnaugh map

The decimal number system is a_____ _system
Positional

The exclusive-OR gate can be constructed using AND, OR and_____ gate
NOT

A_____ is a term with either a single variable, or two or more variables ORed together
Sum term

A Boolean variable is a quantity that may, at different times, be equal to either_____
0 or 1

One basic piece of test equipment used in digital troubleshooting is the_____
Logic Probe

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When the hours counter reaches 12, it will be reset to zero by the_____gate

NAND

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