UNIVERSITY OF GHANA

BSc COMPUTER SCIENCE

FIRST SEMESTER EXAMINATIONS: 2017/2018

CSIT101: INTRODUCTION TO INFORMATION TECHNOLOGY

INSRUCTIONS

ANSWER ALL THE QUESTIONS IN THE ANSWER BOOKLET

SECTION A OBJECTIVES: SELECT THE CORRECT ANSWER FOR EACH QUESTION 40 MARKS TOTAL.

THERE IS ONLY ONE CORRECT ANSWER IN EACH QUESTION

SECTION B - ANSWER ANY FOUR QUESTIONS FOR 20 MARKS TOTAL

TIME ALLOWED: ***TWO AND A HALF (2½) HOURS***

[60 MARKS TOTAL]

1. The following are definitions of Boolean Logic except?

a. Arithmetic using the values True and False

b. True represented by 1 & False represented by 0

c. All systems may represent True by any non-zero value or -1

d. Arithmetic may be represented by logic expressions or by networks of logic gates

1. Which of the following explain Combinational Logic?

a. Combinational logic is when output is determined solely by inputs.

b. Combinational logic produce truth table for circuits and thus reduce its function.

c. Combinational logic is when input is determined solely by outputs.

d. Combinational logic uses input and output to determine its circumference.

1. Which of the following explain Sequential Logic?

a. Sequential logic is when input is determined by inputs and previous state.

b. Sequential logic is when output is determined by inputs and previous state.

c. Sequential logic basic elements uses circuits called *Flops*

d. Sequential logic uses input and output to determine its *latches*

1. In Boolean Logic, the application of SR Flip-Flop formula includes all the following except?

a. If s = r = 0 Then will hold p and q.

b. Avoid s = r = 1 as it then becomes random!

c. Can be configured so q = not p.

d. s = 1 sets q to 1 & r = 1 sets q = 0

1. The following statements are correct about CPU Architecture apart from?

a. CPU is the most important part of a Computer.
b. Performance of a computer depends on CPU speed.
c. A computer clock uses a Crystal oscillator that generates a current at the regular rate.
d. CPU stands for Control Processing Unit

1. The following statements are correct about CPU Architecture apart from?

a. CPU speed is measured as a frequency (number of cycles in a second).
b. CPU speed is measured as a millimetres (number of mile in a second).
c. A computer runs millions of these clock cycles per second (expressed in **MHz**).
d. Pentium III 900 MHz CPU runs 900 million clock cycles in a second.

1. The following statements are correct about major components of a CPU apart from?

a. The major components of a CPU are Arithmetic/Logic Unit (**ALU**) and Control Unit (**CU**)
b. ALU is the unit where all calculations are performed
c. Control Unit (**CU**) includes a number of database registers.

d. CU controls and synchronises execution of instructions.

1. In the CPU Registers, the following are correct apart from?

a. A register is a single cell that holds an item of data.

b. There is a single registers in a CPU.

c. There are several registers in a CPU.

d. Each register has its name, and may be designed to perform a specific function.

1. The essential registers in a CPU includes all except?

    a. Program Counter (**PC**) holds the address of the next instruction to be executed.

    b. Instruction Register (**IR**) holds the mathematical formula currently being executed.

    c. Memory Address Register (**MAR**) holds the address of a memory location.

    d. Memory Data Register (**MDR**) holds the data value that is written to/read from memory.

1. Internal data transfer

    a. Data transfer within a CPU takes place via the internal buses.

    b. Data transfer within a CPU takes place via the external buses.

    c. General Registers are available to hold temporary data and addresses.

    d. Flag Registers show the status of an operation.

1. The following explains types of Memory apart from?

a. Memory in a computer system consists of cells which hold data and program instructions.

b. All data and programs must be loaded in memory first before they are executed.

c. Random Access Memory (**RAM**) is Read and write memory.

d. Non-Volatile (non-permanent) storage of data.

1. The following statements are all correct about RAM except?

a. Memory is the like the brain of the Computer that stores data temporary

b. Hard drive is like the heart of the Computer that stores data permanently

c. Data are lost if power is removed and data is not saved in memory.

d. Data are lost if power is removed and data is not saved in hard drive.

1. The following are Types of RAM besides?

a. DRAM - Dynamic RAM - Needs refreshing but low power requirements and relatively slow.

b. CRAM - Control RAM - Does need Control, but expensive.

c. SRAM - Static RAM - Does not need refreshing, but expensive.

d. EDO RAM - Extended Data Out - Technique for reliable data access with higher data rates

1. The following are Types of RAM besides?

a. ECC RAM - Error Correcting Code - Has ability for some error correction.

b. SDRAM - Synchronous DRAM - Newer type of RAM. Provides better performance than EDO RAM

c. RDRAM - Rambus RAM - Future memory, fast.

d. CDRAM - Control RAM - Future memory, fast.

1. The types of ROM - Read Only Memory includes all the following except?

a. ROM - Read Only Memory: Cannot write to memory and its volatile

b. PROM - Programmable ROM

c. EPROM - Erasable PROM

d. EEPROM - Electrically Erasable PROM

1. The following explains the Cache Memory apart from?

a. Cache holds temporal data and is very fast but small and expensive SRAM

b. Instead of loading data and instructions from memory (which is slow), a CPU loads data and instructions from cache (which is fast).

c. Regular RAM is not fast enough to catch up with the CPU speed.

d. Current data and instruction are stored in the Cache Memory here to improve speed.

1. The following explains the Cache Memory apart from?

a. L1 cache is built into the CPU, so it can operate at the CPU speed.

b. L1 cache size is usually 8Kb - 32Kb.

c. L2 cache are SRAM chips on the motherboard and the size is usually 256Kb - 512Kb

d. L2 cache operate at faster speed than CPU but lower than ordinary memory.

1. The Fetch-Execute Cycle in the execution of CPU instructions includes all except?

a. When running a program, all instructions are stored in consecutive memory locations.

b. CPU can execute only many instruction at a time.

c. Each time the CPU must fetch an instruction from memory and store it into a CPU register first.

d. The PC registers holds the address of the next instruction to be fetched from memory.

1. The Fetch - Execute Cycle includes the following steps

a. Fetch Contents of PC to MAR (*Address of memory location from which data is fetched*)

b. Increment PC and Read memory - place instruction in IR

c. Fetch operand and Decode instruction (if necessary)

d. Execute - Perform instruction and Write operand to memory (if necessary)

1. The following statements are correct about Operating Systems apart from?

a. A set of processes permanently or transitively resident in memory to make the resources of the computer system available in a consistent, reliable and user-friendly manner.

b. Most operating systems do not allow multiple concurrent tasks.

c. The operating system must allocate the processor to the tasks in a way consistent with a scheduling policy

d. The operating system must enable tasks to communicate with each other to pass information and synchronise operations

1. The Operating System Resources includes all except?

a. Processor

b. Memory

c. Ports

d. Input/Output Devices

1. In the OS, each of the tasks needs its own memory space for instructions and data to do all except?

a. Prevent tasks accidentally accessing another tasks memory space

b. Enabling sharing of memory space when necessary

c. May include support for virtual memory

d. All of a task needs to be in immediate access memory for the task to be executed

1. The following explains Memory Management besides?

a. Memory Management makes the most of the memory address space

b. Its function is to enable a number of processes and their associated data to coexist in the same memory space.

c. The virtual memory has no ability to address memory space larger than available main memory.

d. The key to the virtual memory concept is disassociating the address referenced from the address available in main memory

1. The memory manager must achieve all the following except?
    a. Be efficient
    b. Protect processes from each other
    c. Enable sharing of memory where appropriate
    d. Be conspicuous

1. In Data Representation the following are all correct besides?

a. Bit streams are a sequence of bits and the values can be represented as 8 bits = 1 Byte

b. Binary numbers are represented as 0, 1, 2, 4, 5…N

c. Number of values can be represented with n digits: 10^n (decimal), 2^n (binary), 16^n (hex)

d. Largest value can be represented with n digits: 10^n-1 (decimal), 2^n-1 (binary), 16^n-1 (hex)

1. A computer can represent bits in all the following?

a. Characters & numbers

b. Images & movies

c. sounds

d. Monitor/Interface

1. The following are types of Operating Systems except?

a. Single-User Operating Systems

b. Multi-User Operating Systems

c. Database Operating Systems

d. Real-Time Operating Systems

1. The following are all correct in Single-User, Single-Tasking Operating System except?

a. Only one program is executed at a time
b. The user is the operator
c. The user able to execute multi programs
d. Simple and inexpensive

1. The following are all correct in Single-User, Multi-Tasking Operating System except?

a. A user may run several programs at the same time
b. A user may run single programs at the same time
c. One process in foreground remainder in background
d. GUI (Windows/Mac)

1. Convert 10.5_{10} to IEEE single precision floating point number.

a. 11000001001010000000000000000000
b. 01000001001010000000000000000000
c. 11000001101010000000000000000000
d. 01000001101010000000000000000000

1. Convert the result you had from Q7 to hexadecimal.
    a. $4128000
    b. $4A28000
    c. $41C8000
    d. $4AC1000

1. (A + AB) is equivalent to which of the following?
    a. A + B
    b. A
    c. B
    d. B + A

1. (A + A'B) is equivalent to which of the following
    a. A + B'
    b. (A * A+B)'
    c. A' + B
    d. A + B

1. What is the 1's complement representation of 17_{10}
    a. 11101110
    b. 11101111
    c. 11110011

d. 00010001

1. What is IEEE single precision format of -19.5_{10}
    a. 01000001100111000000000000000000

b. 11000011100111000000000000000000

c. 11000001100111000000000000000000

d. 01000000110000011000000000001100

1. Find the base 16 conversion of the result you had for number 5.

   a. C1A61000

   b. C19C0000

   c. A1A90000

   d. D19D0000

1. Find the base 16 conversion of the 11000001100111000000000000000000

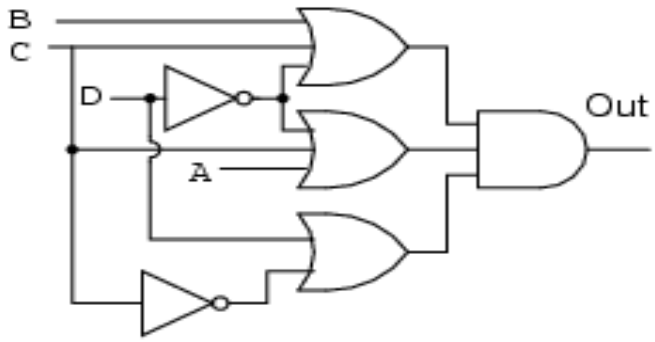
   a. C1A61000

   b. C19C0000

   c. A1A90000

   d. D19D0000

1. What is the output of the circuit diagram below?



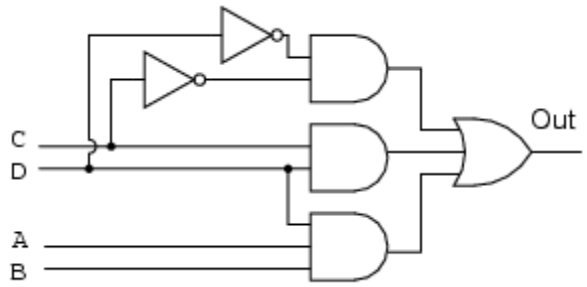
a. (B + C + D) (A + C + D) (C + D)

b. (B + C + D) (A + C + D) (C + D)

c. (B + C + D) (A + C + D) (C + D)

a. (B + C + D) (A + C + D) (C + D)

1. What is the output of the circuit diagram below?



a. C D + C D X A B D

b. C D + C + D + ABD

c. C D + C D + A B D

d. C D + C + D (A B + D)

1. How many bits represent a quad word?
    a. 20 bits
    b. 128 bits
    c. 32 bits
    d. 64 bits

SECTION

EASSY QUESTIONS

ANSWER ANY FOUR QUESTIONS IN THIS SECTION FOR 20 MARKS TOTAL

Q1. Simplify the expression above and draw the resulting expressions logic circuit and table? [5 Marks]

((A + B) + A) V ((B C). C) + (A C). (A D + C D)

Q2. Explain how the essential registers in a CPU process data from the program counter to the memory data registrar? [5 Marks]

Q3. Explain the **Fetch-Execute Cycle** process that the CPU uses in the execution of instructions? [5 Marks]

Q4. Define interrupts and with the aid of a diagram, explain how Multiprogramming System functions in a state transition diagram? [5 Marks]

Q5. Explain the Half Adder and Full Adder and their logic tables for the Arithmetic Logic Unit using a diagram? [5 Marks]

Q6. Using the diagram, explain the main function of the operating system? [5 Marks]