UNIVERSITY OF RUHUNA

BACHELOR OF COMPUTER SCIENCE (GENERAL) DEGREE LEVEL I (SEMESTER I)

EXAMINATION - AUGUST / SEPTEMBER 2017

COURSE UNIT: CSC 1122 (Computer Systems I) Duration: 2 Hours

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*Answer **All** Questions.*

1)

a)

i) Write down the four main hardware categories and list one example device for each of 3 categories written by you.

ii) Write down the main purposes of *ergonomic keyboards* and *chorded keyboards*.

iii) "Keyboard is a primary input device in a computer". Explain the meaning of this statement.

b)

i) Write down 5 main motherboard form factors.

ii) Write down two standard sizes of drive bays available in the computer chassis. Give one example device for each that can be inserted into these two types of drive bays.

iii) "Most **RAM** used for primary storage in personal computers is a **volatile** memory." Explain the meaning of RAM and volatile in the above statement.

c)

i) *Wi-fi* and *IrDA* are two new connecting technologies that can be used to connect devices to computers. Write down two differences between these two technologies.

ii) As a Computer Science graduate, you are going to assemble your personal computer by yourself. You first plan to buy a motherboard, processor and a RAM for your computer. Write down 3 main specifications you consider when you are buying these 3 devices for your computer.

2)

a)

i) Write down three advantages and three disadvantages of LCD monitors over CRT monitors.

ii) Scanners use charged coupled device or contact image sensors as image sensors. Explain how a charged couple device works as an image sensor in a scanner.

iii) Briefly explain the operation of an opto-mechanical mouse.

b)

i) Write down the specific hardware feature/technology used in each of the following computer generations.

- First Generation
- Second Generation
- Third Generation
- Fourth Generation

ii) Compare MARK1 invented in 1944 and ENIAC invented in 1946 using two facts.

iii) "The invention of transistors let the computers enter into the domestic realm". Explain this stating three advantages of transistors over vacuum tubes.

c)

i) Write down three connectors that can be used to connect printers to the computer.

ii) Compare Laser printer and ink jet printer using 4 specific factors

iii) Explain four main functions carried out by the control unit.

3)

a)

i) Memory location is one of the characteristics of memory systems. Giving examples, explain what is meant by memory location in memory systems.

ii) Compare direct and random memory access methods using two differences between them.

iii) Explain how the cache memory is used to shorten the average access time of the memory.

b)

i) Explain five main categories of registers in central processing unit.

ii) Processor bus, PCI bus and AGP bus are main communication pathways used in a computer. Explain the main usage of these 3 buses in a computer.

c)

i) Dual inline memory modules (DIMM) have replaced single inline memory modules (SIMM) currently. Explain the main reason for this replacement.

ii) Write two address instructions (Ex: ADD R, S) to do the following computation. Assume that the required values for the computation is stored at X, Y, Z, P memory address locations.

- D = ((X/Y)*Z) +((Z*P)-(P*X))

4)

a)

i) List down five main characteristics of computer systems that are affected by or affects the instruction length.

ii) In instruction design, there is a tradeoff between including more addresses or fewer addresses to an instruction. Explain this tradeoff providing at least two facts.

iii) Explain the five main operations followed in executing instructions in a central processing unit.

b)

i) Write down and explain the main components of the central processing unit

ii) Draw diagram of the CPU with the main registers involved in instruction execution, control unit, system bus, memory and explain how data flow in the fetch cycle within the instruction cycle.

c)

i) Write down two advantages of direct addressing mode over indirect addressing mode.

ii) A two word instruction is stored at memory addresses 200 and 201. The first word of the instruction specifies the operation and the mode. The second word specifies the address part. Assume that the address field has the value 300. Assume that the content of memory address 300 is 400. Further, assume that the content of memory address 400 is 600. The program counter has the value 200 for fetching this instruction. The content of processor register R is 800, and the content of an index register XR is 101.

- According to the given information, determine the operand values when the direct and indirect addressing modes are used.

- Evaluate the effective address for each of the following addressing modes.
    - Register Indirect
    - Relative
    - Indexed