



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2010/2011 – 1st Year Examination – Semester 1

IT1204 - Computer Systems I

05th March 2011

(TWO HOURS)

Important Instructions :

- The duration of the paper is **2** (two) hours.
- The medium of instruction and questions is English.
- The paper has **50** questions and **11** pages.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with **one or more** correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
- If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

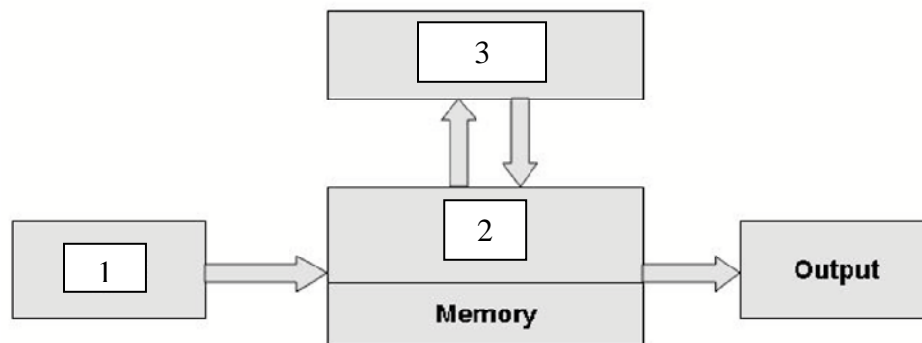
1) Which of the following statements is/are true ?

- (a) Herman Hollerith designed the Analytical Engine.
- (b) The Pascaline developed by Blaise Pascal could perform addition with carry and subtraction.
- (c) The Pascaline developed by Blaise Pascal read data from punch cards.
- (d) Ada Lovelace is considered to be the first computer programmer.
- (e) The Differential Engine was developed by Blaise Pascal.

2) Which component(s) an/ are essential part(s) of a basic computing system?

- (a) A mechanism for transferring data to and from the outside world.
- (b) Pattern driven computing model to extract unique patterns.
- (c) A memory to store both data and programs.
- (d) A processor to interpret and execute programs.
- (e) Personal Information Manager (PIM) software.

3) Consider the following abstract view of the typical components of a computer.



The components marked as 1,2 and 3 respectively represent

- | | |
|--------------------------|--------------------------|
| (a) Storage, Input, CPU. | (b) Input, CPU, Storage. |
| (c) ALU, CPU, Storage. | (d) CPU, Storage, Input. |
| (e) Input, CPU, Output. | |

4) Which of the following statements about second generation computers is/are true ?

- (a) They are based on transistors.
- (b) They are based on ICs.
- (c) They used magnetic drums for primary memory.
- (d) They used magnetic cores for primary memory.
- (e) IBM PC is an example for the second generation computers.

5) What value(s) is/are equivalent to 256 MB?

- | | | |
|-----------------------------|---------------------------|------------------------------|
| (a) 256×2^{12} KB. | (b) 2^{28} Bytes. | (c) 256×10^{-6} TB. |
| (d) 2^{20} MB. | (e) 256×10^9 KB. | |

6) The number 23_{10} is equivalent to

- | | | |
|----------------|----------------|------------|
| (a) 111010_2 | (b) 010111_2 | (c) 23_8 |
| (d) 17_8 | (e) 27_8 | |

7) Which of the following statements about Two's complement representation is/are true ?

- | |
|--|
| (a) All positive and negative numbers begin with 0 and 1 respectively. |
| (b) Division is done by repeated additions only. |
| (c) Two's complement representation of the decimal number -42 is 11010110. |
| (d) Two's complement representation of the decimal number -42 is 11010101. |
| (e) It is widely used in ALU. |

8) What is the loss of accuracy when converting the decimal value -0.0235 to 10-bit floating point representation with a sign bit, 4-bit exponent and a mantissa?

- | | | |
|---------------|---------------|--------------|
| (a) 0.003512 | (b) -0.031250 | (c) 0.023375 |
| (d) -0.015625 | (e) 0.0000625 | |

9) If the right most bit is taken as the most significant bit (MSB) the two's complement number 1011101010 is equivalent to the decimal number

- | | | |
|----------|----------|---------|
| (a) -278 | (b) -234 | (c) 349 |
| (d) -349 | (e) 511 | |

10) Which of the following statements on Hamming Code is/are true ?

- | |
|---|
| (a) Minimum distance between any code words is called Hamming Distance. |
| (b) A Hamming Code with a minimum distance of N can correct upto $(N-1)/2$ errors. |
| (c) A Hamming $d(C_1, C_2)$ Code has C_1 bit data words and C_2 bit code words. |
| (d) The Hamming Distance between 1001 0010 1101 and 1010 0010 0010 is 6. |
| (e) Smallest possible distance between two distinct code words is 2. |

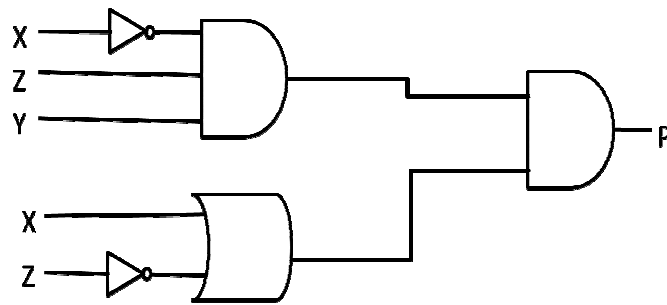
11) Which of the following devices are both input and output devices?

- | | | |
|------------------|-------------------|-------------|
| (a) Mouse | (b) DVD Burner | (c) Plotter |
| (d) Touch Screen | (e) Floppy Driver | |

12) The output of the Boolean function $F(x, y, z) = xy + z\bar{y}$ is 1 when

- | | | |
|-----------------------|-----------------------|-----------------------|
| (a) $x=1, y=1, z=0$. | (b) $x=1, y=0, z=0$. | (c) $x=0, y=0, z=1$. |
| (d) $x=0, y=1, z=0$. | (e) $x=0, y=0, z=0$. | |

- 13) What is the output P of the following digital circuit?



- (a) $(\bar{x} + z + y) + (x\bar{z})$ (b) $(z + y) + (x)$ (c) $\bar{x}zy(x + \bar{z})$
 (d) 1 (e) 0

- 14) Which of the following K-Maps represent(s) the Boolean expression $Q = A + C \oplus B$?

(a)

BA C	00	01	11	10
0	1	0	0	1
1	1	1	1	1

(b)

BA C	00	01	11	10
0	0	1	1	1
1	1	1	1	0

(c)

BA C	00	01	11	10
0	0	0	1	0
1	1	0	1	0

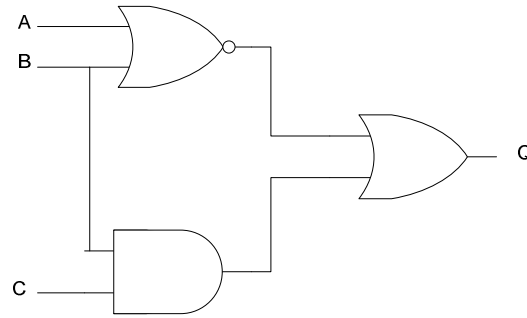
(d)

BA C	00	01	11	10
0	1	0	0	0
1	1	0	1	1

(e)

BA C	00	01	11	10
0	0	1	1	1
1	1	0	0	1

- 15) How many NAND gates are required if each of the gates in the following logic circuit is to be replaced directly by a combination of NAND gates only?



- | | | |
|--------|---------|--------|
| (a) 6. | (b) 7. | (c) 8. |
| (d) 9. | (e) 10. | |

- 16) Consider the following truth table.

A	B	C	F(A,B,C)
1	1	1	1
1	1	0	0
1	0	1	1
1	0	0	1
0	1	1	0
0	1	0	0
0	0	1	0
0	0	0	1

Which of the following expressions is/are represented by the Boolean function F(A,B,C)?

- | | |
|---------------------------------------|--------------------------------|
| (a) $\overline{B.C} + \overline{A.C}$ | (b) $A.C + \overline{B.C}$ |
| (c) $A.C + A + A.B.C$ | (d) $A.C + \overline{(B + C)}$ |
| (e) $A.C + \overline{B.C}$ | |

- 17) If any byte of a particular memory space can be addressed by using a 20-bit address and each location can hold one byte, what should be the size of the memory space?

- | | | |
|----------------|----------------|----------|
| (a) 4096 Bytes | (b) 10 KB | (c) 1 MB |
| (d) 1000 KB | (e) 2048 Bytes | |

- 18) Suppose that any byte of a particular memory space can be addressed by using a 20-bit address and each location can hold a byte. If a 6-byte variable is stored starting at location 1100 1110 0011 0010 0100, what is the address of next available storage location?

- | | |
|-------------------------------|-------------------------------|
| (a) 1100 1110 0011 0010 0111. | (b) 1100 1110 0011 0010 1001. |
| (c) 1100 1110 0011 0011 1010. | (d) 1100 1110 0011 0010 1011. |
| (e) 1100 1110 0011 0010 1010. | |

- 19) Which of the following memory types is/are having a direct data path to the processor?

- | | | |
|----------------|------------|------------|
| (a) SRAM | (b) MPDRAM | (c) EDORAM |
| (d) DDR2 SDRAM | (e) RDRAM | |

20) Which of the following is a/are Network Interface Card(NIC) connectors?

- | | | |
|-------------|----------|---------|
| (a) SCSI | (b) BNC | (c) DB9 |
| (d) USB 3.0 | (e) RJ45 | |

21) A stack-based processor executes the following set of machine instructions sequentially.

PUSH	100
PUSH	101
ADD	
PUSH	102
SUB	
POP	103

Assuming that:

- I. Variables 0000 1010, 0000 0101, 0000 0001 and 0000 0111 are stored at memory locations 100, 101, 102 and 103 respectively,
- II. The stack is byte organized and stack pointer is at 00H, and
- III. All PUSH and POP instructions have a memory operand,

which of the following could be the final result?

- | |
|---|
| (a) Memory location 01H contains the value 0000 0111. |
| (b) Memory location 02H contains the value 103. |
| (c) Memory location 00H contains the value 103. |
| (d) Memory location 103 contains the value 0000 1110. |
| (e) Memory location 103 contains the value 0000 0111. |

22) Which of the following statements is/are true with respect to SCSI interface?

- | |
|---|
| (a) SCSI is a hardware bus similar in function to the ATA controller. |
| (b) SCSI interface does not support connections to multiple devices. |
| (c) SCSI is mainly used to connect high speed disk drives to high end servers. |
| (d) SCSI interface can be used to enhance the performance of high-end PCs using RAID. |
| (e) SCSI support RAID, but not IDE interface controllers. |

23) Consider the following three statements about Fire-Wire and USB interfaces.

- I. The data transfer rate of USB 2.0 is 480Mbps and Fire-Wire 1394a provides up to 400Mbps.
- II. USB allows up to 128 devices to run simultaneously on a single bus and a maximum of 63 devices can be connected to a single IEEE 1394 Fire-Wire adapter card.
- III. Fire-Wire 1394b is substantially faster than Hi-Speed USB.

Which of the following statements is/are correct about Fire-Wire and USB interfaces?

- | | | |
|-------------------------|----------------------|-----------------|
| (a) Only (I). | (b) Only (II). | (c) Only (III). |
| (d) Only (I) and (III). | (e) All are correct. | |

24) Which of the following is a/are System Software?

- | | | |
|----------------|-----------------------|----------------|
| (a) BIOS. | (b) Web Browsers. | (c) Compilers. |
| (d) Emulators. | (e) Utility Software. | |

25) Which of the following is a/are functionality(ies) of an Operating System?

- | |
|---|
| (a) Translates user commands to a form that can be understood by the relevant computer component. |
| (b) Creates a file structure on the computer hard disk where user data can be stored and retrieved. |
| (c) Allocates portions of memory to programs at their request and frees the allocated memory for reuse when no longer needed. |
| (d) Reduces the resolution of high quality images to the required level when the file sizes exceed the capacity expected by an application. |
| (e) Executes special programs to repair damaged files and backup data. |

26) Which of the following statements is/are true with respect to routers?

- | |
|--|
| (a) Routers are used to join similar topologies together and to divide network segments. |
| (b) Routers can be used to regenerate transmission signals between similar network segments. |
| (c) The advantage of using a router over a bridge is that routers can determine the best path that data can take to reach the destination. |
| (d) Bridges can segment large networks and can filter out noise but routers cannot. |
| (e) When a typical WAN is set up, there should be at least two routers. |

27) Which of the following Wi-Fi standards has/have a maximum of 54 Mbps bandwidth?

- | | | |
|------------------|------------------|------------------|
| (a) IEEE 802.11 | (b) IEEE 802.11a | (c) IEEE 802.11b |
| (d) IEEE 802.11g | (e) IEEE 802.11n | |

28) Which of the following technologies is/are used to set up a short range Personal Area Network?

- | | |
|------------------------------------|---------------|
| (a) Wi-Fi | (b) Bluetooth |
| (c) ZigBee | (d) Wi-Max |
| (e) Microwave Access Communication | |

29) Which of the following is/are **not** considered as a magnetic storage device?

- | | |
|-------------------|--------------------|
| (a) Compact Disks | (b) Castlewood Orb |
| (c) Zip Disk | (d) Floppy Disks |
| (e) Punch Card | |

30) Which of the following statements is/are correct about a hard disk drive?

- (a) The hard disk drive speed is measured in cylinder rounds per minute.
- (b) The read/write speed of a hard disk drive is much slower than RAM.
- (c) The number of tracks per disk is equal to the number of cylinders in a hard disk.
- (d) Data transfer rates of the Serial-ATA hard disks are greater than those of ATA hard disks.
- (e) The CPU directly accesses hard disk drive data when primary memory space is not enough.

31) Which of the following parts is/are on a typical computer motherboard?

- | | |
|-----------------------|-------------------------|
| (a) Hard Disk. | (b) Power Supply. |
| (c) Processor Socket. | (d) I/O Controller Hub. |
| (e) RAM cards | |

32) What is/are the components of a typical system bus of a computer motherboard?

- | | | |
|-----------------|-----------------|-----------------|
| (a) Control Bus | (b) ROM Bus | (c) Address Bus |
| (d) Data Bus | (e) Program Bus | |

33) Which of the following statements is/are correct about a Central Processing Unit (CPU) ?

- (a) ALU, Control Unit and Memory are principal parts of a typical CPU.
- (b) ALU executes arithmetic and logical instructions.
- (c) ALU operations are controlled by the Control Unit.
- (d) Both CPU Registers and the Control Unit of the CPU are called the Data-path.
- (e) Address Bus is used to determine the location of the source or destination of the data.

34) The first two bytes of a main memory with 16-bit addresses have the following hex values:

Byte 0 = FFH

Byte 1 = 01H

If these two bytes hold a 16-bit two's complement integer value, what is its decimal value if the bytes are organized as big-endian?

- | | | |
|----------|----------|----------|
| (a) +255 | (b) -254 | (c) +511 |
| (d) -255 | (e) -256 | |

35) Which of the following statements about Video Input Devices is/are correct?

- (a) A DV camera stores the input audio and video on a DVD in digital format.
- (b) A DV camera uses FireWire ports for digital video transfer.
- (c) DVD cameras directly write the video input on to a mini-DVD.
- (d) The webcam cannot be considered as a basic video camera.
- (e) Total video transferring time in using FireWire port is equal to the recorded period of the video.

36) Which of the following statements is/are true with respect to Touchpad?

- (a) Touchpad was invented by Cirque in 1994.
- (b) Touchpad must be locked when an external mouse is connected.
- (c) Touchpad is "Strike-sensitive".
- (d) Touchpad has a square area about 2 inches by 1.5 inches in laptops.
- (e) Touchpads can be found only on laptops.

37) Which of the following statements is/are true with respect to CRT and Flat-Panel LCD monitors?

- (a) A CRT monitor tube is a glass vacuum tube with one-end having an electron gun and the other a display surface coated with phosphors.
- (b) A CRT monitor tube uses four electron beams to generate red, green, UV and blue light.
- (c) The electron beams are used to determine the refresh rate of the CRT monitor screen.
- (d) The LCD Flat-Panel first worked in three-colour mode as RGB.
- (e) A backlight mechanism was introduced to illuminate what was displayed on LCD screen.

38) Consider the following three statements about Multimedia Projectors.

- I. The images projected by the LCD multimedia projectors are bright and sharp but blurred.
- II. The images projected by the DLP multimedia projectors are sharp not blurred and brighter.
- III. DLP multimedia projectors take very little time to cool down when compared with LCD projectors.

Which of the above statements is/are correct ?

- | | | |
|--------------------------|----------------------|-----------------|
| (a) Only (I). | (b) Only (II). | (c) Only (III). |
| (d) Only (II) and (III). | (e) All are correct. | |

39) Which of the following features is/are included in Advanced BIOS?

- | | |
|-----------------------------------|--|
| (a) SWAP Floppy Drive. | (b) Anti-Virus Program enable/disable. |
| (c) DRAM Clock. | (d) PCI/VGA Palette Snoop. |
| (e) Drive A and B enable/disable. | |

40) Which of the following statements is/are always true with respect to the BIOS ROM chip?

- | |
|---|
| (a) True-ROM chip does the writing into the chip during the manufacturing phase. |
| (b) EEPROM chip does the writing after manufacture phase and the chip can be erased using UV light. |
| (c) EEPROM chip can be erased electronically and re-written. |
| (d) PROM chip does the writing after manufacture and the chip can be written only once. |
| (e) Most modern day motherboard BIOS chips are EPROMs. |

41) Which of the following software is/are **not** utility software?

- | | | |
|---------------------|-----------------------|---------------------|
| (a) Anti-Virus | (b) Scan Disk | (c) Organizer Notes |
| (d) Backup Software | (e) Disk Defragmenter | |

42) Which of the following Operating Systems is/are used in embedded systems?

- | | | |
|----------------|----------------|-------------|
| (a) Linux | (b) Windows NT | (c) Android |
| (d) Symbian OS | (e) Windows ME | |

43) Which of the following applications is launched when “windows + E” keys are pressed on 104-key Windows Keyboard?

- | |
|---|
| (a) Windows Internet Explorer program. |
| (b) Windows Explorer program. |
| (c) Windows Application Start Menu. |
| (d) E-drive partition of the HDD |
| (e) Windows My Computer Application program |

44) Which of the following software is/are developed for planning, scheduling, allocating money and controlling resources?

- | | |
|--------------------------------------|------------------------------------|
| (a) Enterprise Application Software. | (b) Financial Management Software. |
| (c) Workgroup Application Software. | (d) Project Management Software. |
| (e) Manufacturing Control Software. | |

45) Which of the following statements is/are true about Cache Memory?

- | |
|---|
| (a) The L1 cache is manufactured using SRAM technology since it is fast and constant when powered on. |
| (b) In modern computers, the L2 cache is referred as the external cache. |
| (c) The L2 cache is manufactured using SRAM since it goes through many refresh cycles per second. |
| (d) When a memory request is generated, the request is first presented to the cache memory. |
| (e) We define a cache miss to be a reference to an item that is not resident in main memory. |

46) Which of the following network peripherals can be used to prepare data, send data and control the flow of data?

- | | | |
|-----------------------|------------|----------------------------|
| (a) Optical Connector | (b) Bridge | (c) Network Interface Card |
| (d) Router | (e) Switch | |

47) Which of the following statements is/are always true about a bus system available in a computer system?

- (a) PCI bus is in the form of 16-bit slots mounted on the mother board and is in white colour.
- (b) The fastest bus in the computer system is the processor bus and is used to transfer data between the processor and cache or main memory.
- (c) ISA bus could handle maximum of only 16-bits, and ISA cards cannot be plugged-in to the EISA slots.
- (d) AGP slots are designed particularly to be used with video cards and have high performance connectivity.
- (e) SCSI adapters cannot be plugged-in to the PCI-X slots.

48) Which of the following statements is/are correct with respect to RAM types?

- (a) SDRAM removes the drawback of latency in synchronizing with the CPU clock.
- (b) The data Transfer on an SDRAM occurs on the rising edge of the motherboard clock cycle.
- (c) DDR2 SDRAMs increase the speed of memory twofold in sending data on both edges of the CPU clock.
- (d) DDR SDRAM memory modules have 184 pins.
- (e) DDR2 SDRAMs consume more power than DDR SDRAMs and generate high heat.

49) Which of the following statements is/are correct about POST?

- (a) The main devices tested by POST are the CPU, motherboard support circuits, ROM, RAM, video graphic adapter and Hard disk drive.
- (b) The POST program is loaded just after locating the first boot sector to start up the computer system.
- (c) The POST program indicates errors in the form of audio codes, on screen messages or check point codes.
- (d) The POST program protects the bootstrapped code from being interrupted by faulty hardware.
- (e) The BIOS program handles the main duties of POST.

50) Which of the following components might need to be considered when upgrading the processor of the computer system?

- | | |
|---------------------------|-----------------|
| (a) Main Storage Device | (b) Main Memory |
| (c) Video Graphic Adapter | (d) Motherboard |
| (e) Power Supply | |
