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.**

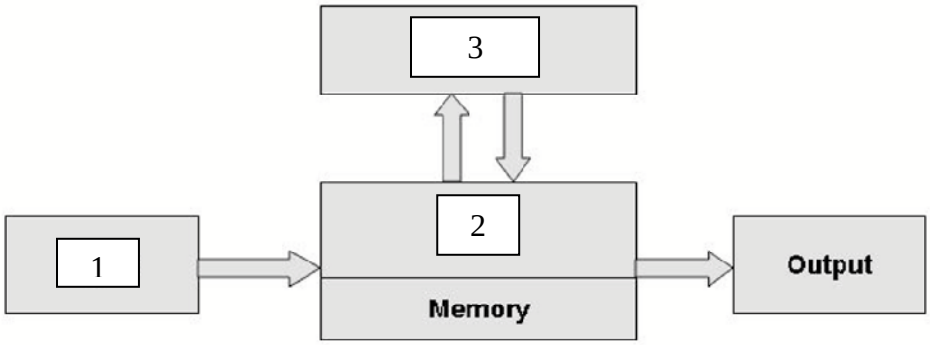
1) Which of the following statements is/are true ?

(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.

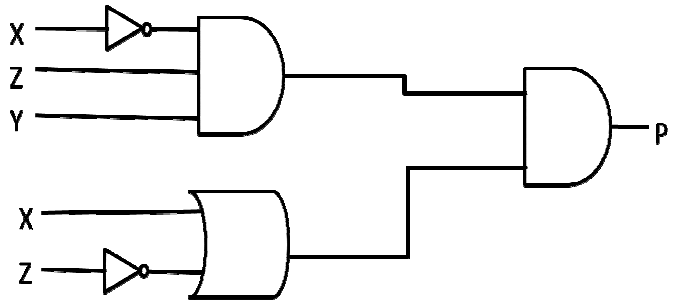
11) Which of the following devices are both input and output devices?

(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

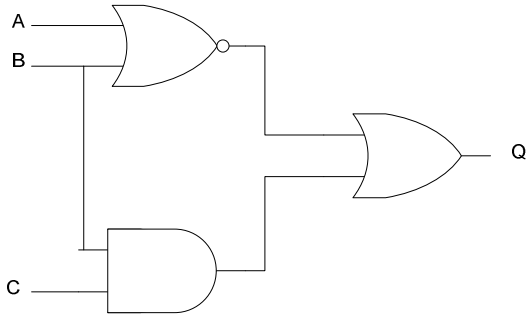
(d)

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

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 relavent 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 allowed 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 a 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 blured.
II. The images projected by the DLP multimedia projectors are sharp not blured 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

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