UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2003/2004 –1st Year Examination – Semester 2

IT2102: Computer Systems

14th August, 2004
(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 **12** 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.
- The questions will be arranged, as far as possible, in an increasing order of difficulty.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from –1 (*All the incorrect choices are marked & no correct choices marked*) 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 is/are correct in relation to computer systems?

(a) Digital computers store information in their memories in the form of groups of bits called words.
(b) Today's microprocessors are byte oriented, with word lengths which are integer multiples of 8 bits.
(c) Today's microprocessors are byte oriented with word length which are integer multiples at 4 bits.
(d) Computers with smaller word length are always slower compared to higher word length computers.
(e) An n-bit word can be arranged into 2^{n-1} unique bit patterns.

2) Consider the following two binary patterns.

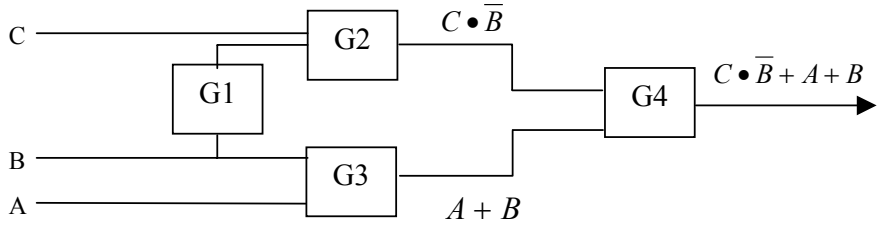
A → 01010100

B → 00110111

Which of the following is/are true?

(a) Decimal equivalent of A is 84 and that of B is 55.
(b) Decimal equivalent of A is 83 and that of B is 54.
(c) Sum of A and B is given by the binary pattern 10001011.
(d) Sum of A and B is given by the binary pattern 01100011.
(e) Sum of A and B is given by the binary pattern 00011101.

3) Consider the following logical circuit with unknown logic gates G1, G2, G3 and G4.



Which of the following is/are correct regarding gates G1, G2, G3 and G4?

(a) G2 is an OR gate, G3 is an AND gate.
(b) G1 is a NOT gate, G4 is an AND gate.
(c) G1 is a NOT gate, G4 is an OR gate.
(d) G2 is an AND gate, G3 is an OR gate.
(e) G2 is an AND gate, G3 is also an AND gate.

4) Which of the following is/are true in relation to Half adder and Full Adder?. Here A, B, C are binary bits and S and C are Sum and Carry bits respectively.

(a) Half adder allows only to add two binary digits.
(b) A Full adder is constructed using two Half adders and an OR gate.
(c) Two outputs of a Half adder are given by $S = \overline{A}.B + A\overline{B}$ and $C = A.B$.
(d) Two outputs of a Half adder are given by $S = A + B.C$ and $C = A.B$.
(e) Two binary numbers can be added using a series of full adders and one Half adder.

5) The following is a truth table for a particular logical operation:

INPUT		OUTPUT
A	B	F
0	0	0
0	1	1
1	0	1
1	1	0

What is/are the correct logic operation(s) for the above truth table?

(a) $F = A \bullet B$ (b) $F = A \oplus B$ (c) $F = \overline{A} \bullet \overline{B}$

(d) $F = \overline{A} \bullet B + A \bullet \overline{B}$ (e) $F = \overline{A} + \overline{B}$

6) The following is a K-map of a logical expression F:

AB / CD	C1	C2	C3	C4
R1			1	1
R2		1	1	
R3		1	1	
R4			1	

Which of the following is/are the correct statement(s) for the above k-map?

(a) C1=00, C2=01, C3=10, C4=11, R1=00, R2=01, R3=10, R4=11

(b) C1=00, C2=01, C3=11, C4=10, R1=00, R2=01, R3=11, R4=10

(c) Simplified function $F = B.D + A.B + A\overline{C}.\overline{D}$

(d) Simplified function $F = A.B.C.D + A.\overline{B} + A.\overline{C}.\overline{D}$

(e) Simplified function $F = A.B + \overline{A}.B.\overline{C}.D + \overline{A}.B.C.D + A.\overline{B}.\overline{C}.\overline{D}$

7) Which of the following is/are correct statement(s) related to a 6-Bit two's complement system?

(a) Two's complement number of the binary number N is given by 2^6-N.

(b) Two's complement number of the binary number N can be evaluated by first finding the One's compliment of N and then by adding 000001.

(c) Two's complement of +15 is given by 001111, and that of –15 is given by 110000.

(d) Two's complement of +15 is given by 001111 and that of –15 is given by 110001.

(e) The most significant bit or the 6^{th} bit is set to zero to represent positive numbers in this system.

8) Some steps in a fetch cycle of an instruction are given below.

(i) Read the instruction from memory.

(ii) Move the instruction to the instruction register.

(iii) Copy the contents of the program counter to the memory address register.

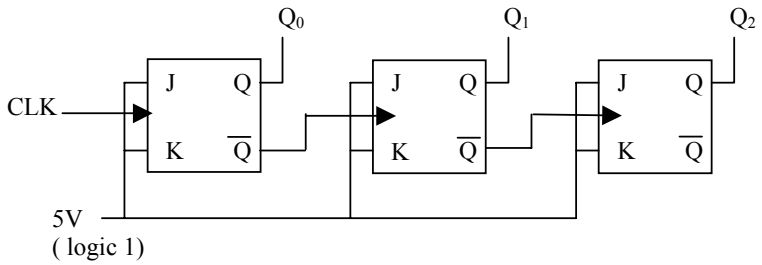
(iv) Transmit the op-code to the control unit.

(v) Increment the contents of the program counter by one.

Which of the following is the correct sequence in the fetch cycle?

(a) (i), (iii), (ii), (v), (iv)	(b) (iii), (ii), (i), (iv), (v)	(c) (iii), (i), (ii), (v), (iv)
(d) (iii), (v), (i), (ii), (iv)	(e) (v), (iii), (i), (ii), (iv)	

9) Consider the following sequential circuit:



Which of the following is/are true in relation to the above sequential circuit?

(a) The above circuit is a 3-bit binary up counter.

(b) The above circuit is a 3-bit binary down counter.

(c) J-K flip-flops in the circuit change the state with a clock pulse.

(d) The above circuit shows a 3-bit parallel register.

(e) The above circuit shows a 3-bit shift register.

10) Which of the following is/are correct in relation to an operating system?

(a) Memory management translates addresses into actual addresses of data within the CPU's memory system.

(b) The ability of a computer to execute several processes concurrently is called multitasking or multiprogramming.

(c) The advantage of a multitasking operating system is that it does not require any deadlock prevention mechanisms.

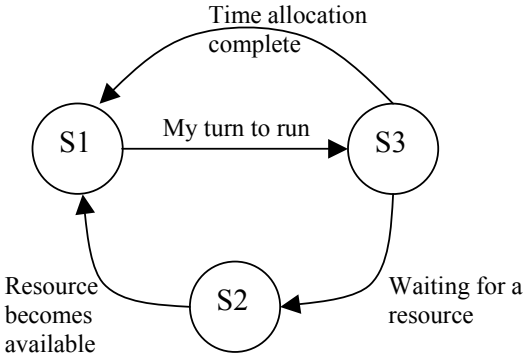
(d) The operating system randomly assigns a process to the CPU for execution.

(e) A process is a program together with its associated program counter.

11) Which of the following is/are the component(s) of a case or chassis of a personal computer?

(a) Internal speaker	(b) Video card	(c) Power switch
(d) Power supply unit	(e) Mouse port	

12) Following shows the state diagram of a process in a multitasking operating system:



Which of the following correctly describe(s) the three states S1, S2 and S3 of a process?

(a) S1 is blocked and S2 is runnable.	(b) S1 is runnable and S2 is blocked.
(c) S2 is blocked and S3 is runnable.	(d) S2 is blocked and S3 is running.
(e) S1 is running and S2 is blocked.	

13) Which of the following is/are true in relation to a Pentium-4 based personal computer system?

(a) The most popular case or chassis form factors are Full-Tower, Mini-Tower and desktop.

(b) Usually the mouse port is indicated by the green colour and keyboard port is indicated by the magenta colour.

(c) The power supply unit has to be separately purchased.

(d) A Pentium-4 processor does not require any cooling fan module.

(e) The power supply unit has a single connector to provide power to the motherboard and the other components fixed to the chassis receive power from the motherboard.

14) Which of the following is/are correct about the primary storage of a personal computer system?

(a) A Pentium-4 processor has a cache memory integrated into the processor.

(b) A Pentium-4 processor uses EDO RAM or SIMMS which are of the 72 pin type.

(c) Some memory required for graphics processing is built-in to the Video card.

(d) The amount of memory displayed at the power on self test includes both cache memory in the main board and video memory in the video card.

(e) A Pentium-4 processor uses RIMMs which are either 184 or 232 pin type.

15) Which of the following is a component(s) of a Pentium-4 processor based motherboard?

(a) Chipset	(b) ROM BIOS	(c) SIMM slots
(d) ISA slots	(e) AGP slot	

16) Which of the following indicate(s) the most suitable parameters for a microprocessor?

(a) Number of transistors used to fabricate the microprocessor
(b) Data I/O and Address bus width
(c) Internal register size
(d) Date introduced
(e) Clock speed

17) Which of the following best describe(s) the Real mode, Virtual real mode and Protected mode of a processor?

(a) Calling an MS-DOS prompt inside windows is a good example of a virtual real mode session in a 32 bit protected mode.
(b) Software programs running in the protected mode are protected from overwriting one another in the memory.
(c) Real mode supports multitasking.
(d) Protected mode supports multitasking
(e) Virtual real mode does not support backward compatibility

18) Which of the following correctly describe(s) physical arrangements of processors?

(a) PGA and SPGA are types of physical pin arrangements on the underside of a processor.
(b) Some pins are not available in a corner of the processor to avoid mistakes at fixing to the slot.
(c) Intel 386 and Intel 486 use a single edge contact processor package (SEC).
(d) Pentium II is a good example for a single edge contact processor package (SEC).
(e) Pentium-4 uses micro pin grid array chip packaging (mPGA).

19) Which of the following correctly describe(s) cache memory in a personal computer?

(a) Cache memory is a high speed memory buffer that temporarily stores data which the processor needs.
(b) Two levels of processor or memory cache called L1 and L2 are used in a modern personal computer.
(c) The use of cache memory reduces a traditional system bottleneck because RAM is much slower than the processor.
(d) The cache memory fixed to the main board is called the Level 1 cache or L1.
(e) The cache memory built-in to the processor is called the Level 1 cache or L1.

20) Which of the following is/are correct with regard to the motherboard of a personal computer?

(a) Motherboard form factor essentially introduces the size, shape and design of the motherboard.
(b) Most full size desktop and tower systems today use ATX and NLX motherboards.
(c) Most full size desktop and tower systems today use Baby-AT motherboards.
(d) Flex-ATX and Micro-ATX motherboards are smaller in size than ATX motherboards.
(e) Any motherboard can be fixed in to any chassis regardless of the chassis type.

21) Which of the following is/are correct with regard to processor sockets/slots in the motherboard of a personal computer?

(a) A Pentium-I processor is fixed to a motherboard with a socket 478.
(b) Single Edge Cartridge based processors are supported by Slot 1 of a motherboard
(c) Sockets 1,2,3,4,5 and 6 were used by processors earlier than Pentium I.
(d) A Pentium-4 processor is fixed to a modern motherboard with socket 478 which is of 478 pins.
(e) Pentium II processors are supported by motherboards with socket 7.

22) Which of the following is/are correct with regard to the chipset in a motherboard of a personal computer?

(a) The connection between the high-speed processor bus and the slower AGP and PCI buses is called the North bridge.
(b) The connection between the PCI bus and the slower ISA bus is called the South bridge.
(c) The newer 800 series chipsets are based on North/South bridge architecture.
(d) Conventional motherboard chipsets are based on North/South bridge architecture.
(e) The newer 800 series chipsets are based on Hub architecture.

23) What are the main buses in a Pentium-4 based personal computer system?

(a) PCI bus (33 MHz 32-bit bus) and ISA bus (8MHz 16-bit bus
(b) SCSI bus, FSB bus, PC100 bus and ATA-UDMA/66 bus
(c) USB 1.1 bus, IEE-1284 parallel bus and VL bus
(d) MCA 32 bit bus and RS-232 serial HS bus
(e) Processor bus (front side bus) and AGP bus (high speed 32-bit bus)

24) Which of the following is/are correct with regard to Dynamic memories (DRAM) and Static memories (SRAM)?

(a) SRAM is more inexpensive than DRAM
(b) DRAM requires the data to be refreshed every 15ms, but Static RAM does not require periodic refreshing.
(c) SRAM chips are physically smaller and store a large number of bits (High density).
(d) Various DRAM modules such as SIMM, DIMM and RIMM are available.
(e) SRAM is much faster than DRAM.

25) Which of the following is/are the main reason(s) for a hard disk to be manufactured as a sealed unit?

(a) It is a requirement of an IDE/ATA interface.
(b) To decrease the effects of external magnetic fields
(c) To safeguard the data recorded from viruses
(d) To increase the number of sectors on each platter
(e) In order to make the gap between the read/write heads and the recording surface very small

26) Which of the following is/are correct with regard to ROM BIOS functions of a personal computer?

(a) BIOS is a collection of programs included in the master boot record of the computer.
(b) POST routine is one of the program in the ROM BIOS.
(c) SETUP program is usually a menu driven program to set configuration parameters and is also included in the ROM BIOS.
(d) Bootstrap loader is a routine that reads the disk drives looking for a valid master boot sector.
(e) BIOS is a collection of programs embedded in a read only chip in the motherboard.

27) Which of the following is/are correct in relation to an ATA interface?

(a) ATA stands for Advanced Termination Adapter.
(b) An ATA interface is directly integrated into almost all PC motherboard chipsets today.
(c) ATA is based on the concept that the controller is built into the drive.
(d) It is an adapter card, which goes into a PCI slot in a PC.
(e) ATA is another name for an SCSI interface.

28) The total number of sectors of a hard disk which has 16,383 cylinders, 16 heads and 63 sectors per track is

(a) 1032129. (b) not determined by the data provided. (c) 262128.
(d) 16514064. (e) 8257032.

29) Which of the following statement is/are correct in relation with the Small Computer System Interface (SCSI)?

(a) It is available only for Notebook computers.
(b) It is only an alternative to IDE.
(c) It is used only to connect hard disk drives.
(d) It is a fast interface, generally suited to high performance workstations and servers.
(e) It is a system level interface, which allows the connection of many types of devices.

30) The reason(s) for the serial ports of a PC not to function properly can be that

(a) the required communication files are not present to support the serial ports.
(b) the parallel port is doing the communication function.
(c) the USB and the parallel ports are doing the communication function.
(d) the port is in conflict with other devices.
(e) the cable used is less than 50 feet in length.

31) What is the Media Transfer Rate of a hard disk, which has 688 sectors per track, and rotational speed of 7200 rpm?

(a) 42.27 MB/sec (b) 1.26 MB/sec. (c) 2.52 MB/sec
(d) 5.28 MB/sec (e) 20.16 MB/sec

32) Which of the following is/are the correct statement(s) in relation to a Parallel port connection?

(a) There are 8 – data pins and 8 – Ground pins.
(b) There are 8 – data pins and 1 – Common Ground pin.
(c) There is a Carrier Detect pin.
(d) There is a Paper Jam pin.
(e) There is a Tonar Low pin.

33) Which of the following is/are correct in relation to USB?

(a) It is an external peripheral bus standard designed to bring plug and play capability for attaching peripherals externally to the PC.
(b) USB allows up to 150 devices to run simultaneously on a single bus with peripherals.
(c) It eliminates the need for special purpose ports, reduces the need to use special purpose I/O cards and saves important system resources such as interrupts.
(d) USB disables peripherals to be automatically recognized and configures as soon as they are physically attached, without the need to reboot the system.
(e) The number of USB devices connected to a PC can be increased by using a USB hub.

34) Select from among the following, the correct order(s) of preparing a hard disk drive for data storage:

(a) Partitioning, High Level Formatting, Low Level Formatting
(b) High Level Formatting, Partitioning., Low Level Formatting
(c) Low Level Formatting, Partitioning, High Level Formatting
(d) Low Level Formatting, High Level Formatting, Partitioning
(e) High Level Formatting, Partitioning, Low level Formatting

35) Which of the following gives the correct values for the parameters “Bytes per Sector”, “Sectors per Track”, “Tracks per Side” and “Number of Sides” respectively of a 3.5” 1.44 MB Floppy disk?

(a) 256, 18, 160 and 2 (b) 512, 18, 160 and 1 (c) 512, 18, 80 and 2
(d) 256, 36, 80 and 2 (e) 512, 36, 40 and 2

36) Which of the following is/are correct statement(s) in relation to a mouse?

(a) The moving speed of the pointer on the screen is fixed.
(b) The user can interchange the use of the left and right buttons.
(c) The mouse cannot be considered as a pointing device.
(d) A Scroll button is an extra feature of a mouse.
(e) An external mouse can be connected to a notebook computer.

37) Which of the following is/are correct in explaining hard disk technology?

(a) The latency time depends on the rotational speed.
(b) A single drive unit can be used to boot up the system with two Operating Systems.
(c) The recording capacity of a sector can be higher than that of a cylinder.
(d) The heads of the same drive can move independently.
(e) RAID enables the different platters of a hard disk drive to act as separate disks in an array.

38) What is the minimum amount of memory required in a video adapter which enables about 16.7 million colours at the resolution of 1024 x 768 ?

(a) 512 KB	(b) 4 MB	(c) 8 MB
(d) 2 MB	(e) 16 MB	

39) Which of the following printers fall(s) into the category of non-impact printers?

(a) Line printers	(b) Ink Jet printers	(c) Laser printers
(d) Dot matrix printers	(e) Colour Laser printers	

40) Which of the following device(s) can be considered as networking equipment?

(a) LAN	(b) Modem	(c) Router
(d) Switch	(e) WAN	

41) Typically, the data transfer speed of a network connection can be given in

(a) Kilo Bytes per Second.	(b) Mega Bits per Second.	(c) Mega Bytes per Second.
(d) Kilo Bits per Second.	(e) Lines per Second.	

42) In relation with the “Supervisor password” and the “User password” of Personal Computers, which of the following statements is/are correct?

(a) Any of the above passwords can be used to access the BIOS Set up menu.
(b) If only the “Supervisor Password” is set, the system will boot up without asking for the password.
(c) If the “User Password” is set the password prompt is displayed before the computer boots up.
(d) If both the passwords are set any of the passwords can be used to boot up the computer.
(e) The “User Password” cannot be used to view the BIOS settings.

43) To protect a Local Area Network from unauthorized accesses from online outsiders, which of the following remedies can be taken?

(a) Use of a Firewall	(b) Disconnection of the external links
(c) Use of a virus guard	(d) Use of passwords for all the computers in the network
(e) Shutting down the web servers	

44) Which of the following items can be used to share a dial-up line to provide Internet connections to multiple computers?

(a) Mail Server	(b) Domain Name System Server	(c) Proxy Server
(d) File Server	(e) Database Server	

45) Select the correct item(s) from among the following, which directly characterize(s) the performance of a PC.

(a) Number of USB ports	(b) Chipset	(c) Front Side Bus Speed
(d) Scanning Frequency of the Display unit	(e) Speed of the UART	

46) The problems which occur during POST are usually denoted by

(a) Text Error Messages displayed on the screen.	(b) Graphical Symbols displayed on the screen.
(c) a sequence of beep sounds.	(d) message printed on the printer attached.
(e) an entry on the system error log file of the disk.	

47) What is/are the essential minimum requirement(s) to be satisfied for a PC to be booted up with a CD?

(a) The hard drive must be physically disconnected or formatted.
(b) The boot sequence in the BIOS must be changed.
(c) There must be a CD in the CD drive.
(d) The floppy drive cable must be removed.
(e) There must be a bootable CD in the CD drive.

48) Which of the following cannot be considered as new trends in PC manufacturing?

(a) Increase in the rotational latency of the hard disk drives
(b) Increased use of S-ATA interface
(c) Use of 64-bit microprocessors
(d) 3GHz or higher clock speeds
(e) Use of single tasking Operating Systems

49) Which of the following is/are not (a) feature(s) of WORM viruses?

(a) It is a virus, which only infects the software of a computer system and not the hardware.

(b) It is a virus, which occupies the boot sector of a floppy disk or hard disk and loads into memory during the boot-up process.

(c) This type of virus attaches itself to executable files and installs itself on the system whenever the executable file is run.

(d) They are often designed to read the computer users, contact e-mail lists, and then e-mail themselves to every address within that list.

(e) WORMs copy themselves from computer to computer rather than from file to file, and because they require no human intervention to do so, they can spread much more rapidly than regular computer viruses.

50) Which of the following statements is/are correct in relation to defragmentation?

(a) The processes taking place at every boot up to check all the disk files are in the correct order.

(b) A method of scanning used by virus scanners to check for the signatures of all known viruses.

(c) A method of swapping files between the main memory and the hard disk.

(d) A process of rewriting parts of a file to contiguous sectors on the hard disk to increase the speed of access.

(e) A method of scanning the hard disk for bad sectors.

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