Assignment 2

Name : Click or tap here to enter text.

Admin : Click or tap here to enter text.

# Data Representation (40 marks)

## Conversion between binary, decimal, hexadecimal, octal and base-7 (20%)

Convert the numbers between binary, decimal, hexadecimal, octal and Base-7. Assume that you have an 8-bit computer system. Assume unsigned representations only. Show your workings for each conversion and indicate the base for each number.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Decimal | Binary | Octal | Hexadecimal | Base-7 |
| 30 | 00011110 | 36 | 1E | 42 |
| 129 | 10000001 | 201 | 81 | 243 |
| 159 | 10011111 | 237 | 9F | 315 |
| 170 | 1010 1010 | 252 | AA | 332 |
| 256 | 11111111 | 400 | 100 | 514 |

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## Find the decimal equivalent of the following binary numbers. Assume that you are using an 8-bit computer. Show your working solution for decimal and floating point separately. (8%)

* + 1. (1010.10101010)2
    2. (11110011.11001111)2

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## Solve the following using two’s complement. Assume that you are using an 8-bit computer and signed data representation is used. Show your working solution, including the conversion from decimals to binary. (12%)

* + 1. 10010 – 5010
    2. 2010 – 6010

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# Networking (60 marks)

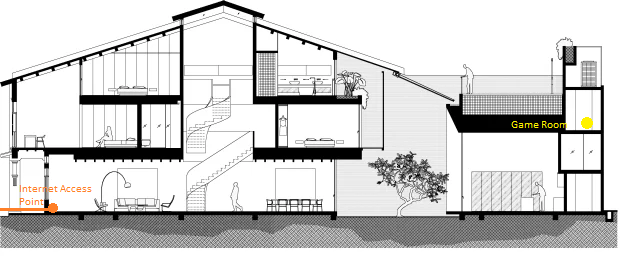
## Networking Multiple Answer Questions (30%)

Write your answer in the boxes on the right side of each question.

|  |  |
| --- | --- |
| * + 1. In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are \_\_\_\_\_\_\_\_\_\_\_  1. Added 2. Removed 3. Rearranged 4. Modified |  |
| * + 1. A \_\_\_\_\_\_\_ is the physical path over which a message travel.  1. Path 2. Medium 3. Protocol 4. Route | B |
| * + 1. Two devices are in network if \_\_\_\_\_\_\_\_\_\_  1. a process in one device can exchange information with a process in another device 2. a process is running on both devices 3. PIDs of the processes running of different devices are same 4. a process is active, and another is inactive | A |
| * + 1. In computer network nodes are \_\_\_\_\_\_\_\_\_  1. the computer that originates the data 2. the computer that routes the data 3. the computer that terminates the data 4. all the above | A |
| * + 1. Bluetooth is an example of \_\_\_\_\_\_\_\_\_\_  1. personal area network 2. local area network 3. virtual private network 4. wide area network | A |
| * + 1. A list of protocols used by a system, one protocol per layer, is called \_\_\_\_\_\_\_\_  1. protocol architecture 2. protocol stack 3. protocol suite 4. protocol system | B |
| * + 1. Network congestion occurs \_\_\_\_\_\_\_\_\_  1. in case of traffic overloading 2. when a system terminates 3. when connection between two nodes terminates 4. in case of transfer failure | A |
| * + 1. The physical layer is concerned with \_\_\_\_\_\_\_\_\_\_\_  1. bit-by-bit delivery 2. process to process delivery 3. application to application delivery 4. port to port delivery | A |
| * + 1. The physical layer provides \_\_\_\_\_\_\_\_\_\_  1. mechanical specifications of electrical connectors and cables 2. electrical specification of transmission line signal level 3. specification for IR over optical fiber 4. all the above | D |
| * + 1. The physical layer is responsible for \_\_\_\_\_\_\_\_\_\_  1. line coding 2. channel coding 3. modulation 4. all the above | D |
| * + 1. The physical layer translates logical communication requests from the \_\_\_\_\_\_ into hardware specific operations.  1. data link layer 2. network layer 3. transport layer 4. application layer | A |
| * + 1. Which of the following tasks is not done by data link layer?  1. framing 2. error control 3. flow control 4. channel coding | D |
| * + 1. Which sublayer of the data link layer performs data link functions that depend upon the type of medium?  1. logical link control sublayer 2. media access control sublayer 3. network interface control sublayer 4. error control sublayer | A |
| * + 1. When 2 or more bits in a data unit has been changed during the transmission, the error is called \_\_\_\_\_\_\_\_\_\_\_\_  1. random error 2. burst error 3. inverted error 4. double error | D |
| * + 1. Which of the following is a data link protocol?  1. ethernet 2. point to point protocol 3. HDLC 4. all the above | D |
| * + 1. The network layer is concerned with \_\_\_\_\_\_\_\_\_\_ of data.  1. bits 2. frames 3. packets 4. bytes | C |
| * + 1. A 4-byte IP address consists of \_\_\_\_\_\_\_\_\_\_  1. only network address 2. only host address 3. network address & host address 4. network address & MAC address | C |
| * + 1. ICMP is primarily used for \_\_\_\_\_\_\_\_\_\_  1. error and diagnostic functions 2. addressing 3. forwarding 4. routing | A |
| * + 1. Which one of the following algorithms is not used for congestion control?  1. traffic aware routing 2. admission control 3. load shedding 4. routing information protocol | B |
| * + 1. Transmission control protocol \_\_\_\_\_\_\_\_\_\_\_  1. is a connection-oriented protocol 2. uses a three-way handshake to establish a connection 3. receives data from application as a single stream 4. all the above | D |
| * + 1. An endpoint of an inter-process communication flow across a computer network is called \_\_\_\_\_\_\_\_\_\_  1. socket 2. pipe 3. port 4. machine | A |
| * + 1. Transport layer protocols deals with \_\_\_\_\_\_\_\_\_\_\_\_  1. application to application communication 2. process to process communication 3. node to node communication 4. man to man communication |  |
| * + 1. Transmission control protocol \_\_\_\_\_\_\_\_\_\_\_  1. is a connection-oriented protocol 2. uses a three-way handshake to establish a connection 3. receives data from application as a single stream 4. all the above |  |
| * + 1. Which of the following is not applicable for IP?  1. Error reporting 2. Handle addressing conventions 3. Datagram format 4. Packet handling conventions |  |
| * + 1. Which of these is not applicable for IP protocol?  1. is connectionless 2. offer reliable service 3. offer unreliable service 4. does not offer error reporting |  |
| * + 1. First address in a block is used as network address that represents the \_\_\_\_\_\_\_\_  1. Class Network 2. Entity 3. Organization 4. Codes |  |
| * + 1. The header length of an IPv6 datagram is \_\_\_\_\_\_\_\_\_\_\_  1. 10bytes 2. 25bytes 3. 30bytes 4. 40bytes |  |
| * + 1. IPv6 does not use \_\_\_\_\_\_\_\_\_ type of address.  1. broadcast 2. multicast 3. anycast 4. unicast |  |
| * + 1. Which statement(s) about IPv6 addresses are true?  1. Leading zeros are required 2. Two colons (::) are used to represent successive hexadecimal fields of zeros 3. Two colons (::) are used to separate fields 4. A single interface cannot have multiple IPv6 addresses of different types | B |
| * + 1. In IPv6 addresses, addresses that start with eight 0s are called \_\_\_\_\_\_\_\_  1. Unicast addresses 2. Multicast addresses 3. Any cast addresses 4. Reserved addresses |  |

## Networking Design (30%)

If you are residing in this house, then you have a Game Room at the back of your house where you have devices such desktop computer, game console and tablet computer. You may play your mobile game in this room.



You have a fibre broadband which enters your main door and you had installed the Optical Network Terminal near the main door, and a wireless router next to it. This router has 4 wired LAN sockets on it. The distance between your Game Room and the router is about 80m.

* + 1. How will you connect the devices in your Game Room to the router, so that you have the lowest ping rate possible? (10 marks)

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* + 1. Justify your network design in less than 500 words. You should provide technical evidence to explain why your choices are the best. (20 marks)

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End of Assignment 2