CS Topic 3-Networks February 8th 2013

Mr Trofimczuk

**Instructions:**

* Time provided for test: 1hr 05min
* Total marks is 60
* Test results will be calculated into a percentage and worked out into a grade between 1-7 (see grade boundaries below) and published on Wilma. Results will also be sent to each student email address.
* **All electronic devices must be turned off**
* Answer all questions on the paper provided and ensure you have wrote your full name on each piece of paper-Remember to write an email address on answer paper.

**Test Questions:**

1. *Define the term computer network? (1 mark)*

* *Set of interconnected computers that communicate and share resources.*

1. *Define the term Bandwidth? (1 mark)*

* *Measure used to identify the total data capacity of a network.*

1. *What is the synonym for data transfer rate? (1 mark)*

* *Usually Mbps (million bits per second) or MBps (million bytes per second)*

1. *Describe the key differences between the following LAN topologies: ring, star and bus (6 marks)*

* *Ring: All nodes are connected in a closed loop. Messages travel in one direction.*
* *Star: Central node controls all message traffic. Huge burden on central node, so when this node fails communication on network stops.*
* *Bus: All nodes share a common line in which communication travels in both directions*

1. *Explain how data is transmitted by package switching (6 marks)*

Packet Switching is the approach to network communication in which packets are individually routed to their destination then reassembled.

* Packets may take up to several different routes, so can arrive in a different order
* Routers direct the packets as they move between networks
* On arrival at the final destination the packets are put back into the proper order

1. *Outline possible problems that may arise due to packet switching? (3 marks)*

* *Packet size can affect speed*
* *High number of packets can cause possible problems such as packets being dropped, routers crashing*
* *When packets get re-assembled on the other end the process is only completed once all packets have arrived-some possible time delays if router traffic is busy.*

1. *Explain how the use of a VPN has led to changes in working patterns-include both advantages and disadvantages? (6 marks)*

***Good-****cost savings, scalability, security, compatibility with broadband technology*

***Disadvantages****-deployment requires a high-level of knowledge and understanding, possible public network security, its availability and performance are difficult to control, VPN speeds are much slower than those experienced with a traditional connection encryption-increased downtime*

1. *Outline the role of the OSI seven layer model (3 marks)*

* *7 layers in which each layer deals with network communication*
* *Lower layers deal with the basic electrical and mechanical functions*
* *Uppers layers deal with the application functions*

1. *Define the term router? (1 mark)*

* *Network device that directs packets between networks*

1. *Identify two factors that should be considered when selecting transmission media (2 marks)*

* *Transmission medium with cable & Wi-Fi?-Latency, Broadband of each?*
* Cabling Type & length- Coaxial Cable, Twisted Pairs Cable, Fiber Optics Cable

1. List 3 possible factors that can effect network transmission speed and include a brief description in each example (3 marks)

* *Switches-type/speed and traffic*
* *Cabling Type & length*
* *Interference-electricity,*
* *Network use-eg: streaming*
* *Network topology type*
* *Structural limitations*
* *Compression techniques*

1. *Define the term data packet (1 mark)*

* *Unit of Data sent across a network*

1. *Define the term Data Protocol (1 mark)*

* *Set of rules that defines how data is formatted and processed on a network*

1. *Define TCP/IP (2 marks)*

* *A suite of protocols and programs that support low-level network communication*

1. *List 3 other protocols based on the TCP/IP protocol suite (3 marks)*

* SMTP
* FTP
* Telnet
* HTTP

1. *Outline the differences between the following two types of data compression: Lossy & lossless? (4 marks)*

* *Lossless-Algorithms used to represent data, so redundancy is reduced*
* *Lossy-Some data is removed or less important details dropped, so the user is unable to tell the difference.*

1. *Define the term latency? (2 marks)*

* *Term used to measure interference of network*

1. *Outline 3 types of network security (3 marks)*

* *Firewalls*
* *Antivirus software*
* *Authentication*
* *Policy agreements*
* *Wi-Fi range*

1. *Describe the key characteristics of wireless networks (5 marks)*

* *No wires*
* *Router*
* *Signal strength weakens with distance*
* *Interference from obstacles & materials*
* *ISP is required*
* *Modem*
* *Security-WEP, WPA, WPA-2*

1. *WiMAX is not intended to replace Wi-Fi. Instead, the two technologies complement each other. Discuss (6 marks)*

* *Both use wireless technology*
* *Wimax eliminates the constraints of Wi-Fi by working over longer distances*
* *WiMax can be cheaper over longer distances then using the traditional Wi-Fi router setup*
* *Quality of service with Wimax is same as cellular*
* *WiMAX is a standards initiative. Its purpose is to ensure that the broadband wireless radios manufactured for customer use interoperate from vendor to vendor. The primary advantages of the WiMAX standard are to enable the adoption of advanced radio features in a uniform fashion and reduce costs for all of the radios made by companies, who are part of the WiMAX Forum*

**Mr Trofimczuk’s Grade Boundaries for Computer Science (updated January 2013)**

Grade Percentage

1 0-25%

2 26-36%

3 37-47%

4 48-58%

5 59-69%

6 70-79%

7 80%-100%