NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOMKAMPUS

Benodigdhede vir hierdie vraestel/Requirements for this paper:				Oopboek-eksamen/ Open book examination:	
Multikeusekaarte/ Multi choice cards:		Nie-programmeerbare sakrekenaar/ Non-programmable calculator:			
Grafiekpapier/ Graphic paper:		Draagbare rekenaar/ Laptop:			

EKSAMEN/ EXAMINATION:	Klastoets 3	KWALIFIKASIE/ QUALIFICATION:	**B.Sc.; B.Sc. in IT;**
MODULEKODE/ MODULE CODE:	**ITRW322**	DUUR/ DURATION:	30 minute
MODULE BESKRYWING/ SUBJECT:	**Bedryfstelsels** / *Operating systems*	MAKS / MAX:	20
EKSAMINATOR(E)/ EXAMINER(S):	Mnr. H. Foulds	DATUM / DATE:	**2018/10/15**
		TYD / TIME:	**11:00**

Vraag 1 / Question 1

1.1) Beskryf die ideale omgewings waar Datagram- en Virtuele Stroombaan-netwerke gebruik sal word.

Describe the ideal environments where Datagram and Virtual-circuit networks will be used. (6)

Datagram vs Virtual-circuit:

- Connection-less vs Connection oriented (2)
- Discussion of saving of state information, routing of individual packets or routing for circuit setup, or effect of router failures (2)
- If QoS is important, Virtual Circuit implements QoS easier, difficult for Datagram (2)
- If Congestion control is important, Virtual Circuit implements Congestion control easier, difficult for Datagram (2)

(Max 6 marks)

1.2) Vergelyk die vereistes vir QoS (Jitter, Loss) in die volgende toepassings met motiverings:

Compare the requirements for QoS (Jitter, Loss) in the following applications with motivaitons:

Email, Videoconferencing, Games (8)

Email has ***no specific requirements for jitter or loss***. Data is not as time sensitive as for other applications, and therefore no jitter requirements. Email uses connection-oriented services, and compensate for loss by retransmitting packets, again not as time sensitive as other applications.

Videoconferencing ***requires low jitter*** for efficient playback of audio and video. Loss may influence the performance of the network because it lowers the effective data rate of successfully transmitted data, and videoconferencing requires high data rate. While there are **no specific requirements for loss**, there are requirements for high data rate.

Games require low **delay**, especially real-time games**.** If jitter is large, but delay is **below** e.g. 250-300ms, it does not have a large impact on the performance of most games. Thus, there are ***specific requirements for low delay, but not for jitter***. The general required data rate for games is much lower than e.g.

videoconferencing. Loss will have a much smaller impact because of the lower data rate requirement, thus ***no specific requirements for loss***.

(2x3 marks for jitter and loss comparisons, 1 mark for motivations for jitter, 1 mark for motivations for loss)

1.3) Bereken die beste klaslose subnet masker vir 'n netwerk wat bestaan uit 390 rekenaars en toestelle. Indien die gegewe IP adres in die netwerk is, wat is die netwerk, eerste toestel, laaste toestel en uitsaai-adresse? Beskryf wat moet gebeur as hierdie 'n klasvolle netwerk moet wees.

Calculate the best classless subnet mask for a network consisting of 390 computers and devices. If the given IP address is in the network, what are the network, first device, last device and broadcast IP addresses? Describe what should happen if this has to be a classful network.

IP adr: 129.29.251.13

```
Address:   129.29.251.13          10000001.00011101.1111101 1.00001101
Netmask:   255.255.254.0 = 23     11111111.11111111.1111111 0.00000000
Wildcard:  0.0.1.255              00000000.00000000.0000000 1.11111111
=>
Network:   129.29.250.0/23        10000001.00011101.1111101 0.00000000 (Class B)
Broadcast: 129.29.251.255         10000001.00011101.1111101 1.11111111
HostMin:   129.29.250.1           10000001.00011101.1111101 0.00000001
HostMax:   129.29.251.254         10000001.00011101.1111101 1.11111110
Hosts/Net: 510
```

1 mark – subnet mask (netmask)

1 mark – network

1 mark – broadcast

1 mark – first device (hostmin)

1 mark – last device (hostmax)

1 mark – For classful, change the subnet mask to class B (255.255.0.0). The network, first, last and broadcast addresses will change, but 129.29.251.13 will still be in the network.

(6)

Totaal / Total: **[20]**