School of Computing
Queen's University

CISC324

Fall 2022

Deadline to submit: Dec. 5, 2022 (for all including accommodation)

Marks total: 10

Q1. In a message passing system, messages sent by a process _____C_____[1]

a) should be of a fixed size
b) should to a variable size
c) can be fixed or variable sized
d) none of the mentioned

Q2. Two communicating processes, P and Q, send and receive messages via a link, that called _____A_____ [1]

a) communication link
b) message-passing link
c) synchronization link
d) all of the mentioned

Q3. What happens in a direct communication? [1] B

a) A communication link can be associated with N number of process
b) A communication link is associated with exactly two processes
c) If N is the number of processes, exactly N/2 links exist between each pair of processes
d) At least two link exists between each pair of communicating processes

Q4. Assuming the following processes with the required CPU burst time arrives at the ready queue at the same time, what is the average waiting time based on non-preemptive shortest job first and first come first serve approach. Show the corresponding Gantt chart. [3]

$P_5 \rightarrow P_2 \rightarrow P_4 \rightarrow P_1 \rightarrow P_3$

Waiting time : 0 (+3) 3 (+4) 7 (+7) 14 (+8) 22

Process	Burst time
P1	8
P2	4
P3	10
P4	7
P5	3

$(0+3+7+14+22)/5$

$= 9.2$

shortest : 9.2

Q5. Explain the starvation and aging concept while working on CPU scheduling approaches. Give example scheduling algorithms that suffer from starvation problem. How would you solve such problem? [2]

When low-priority processes have longer burst times, they may never execute that leading to starvation. SJF algorithms will result in starvation. Because if longer processes come, they will have to wait for longer periods of time. To solve this problem, we can add a time quantum to increase the process's priority. This is referred to as aging. There is no chance of starving in round robin because each process is given a quantum or a defined time to execute.

Q6. One of the Inter-process communication techniques is the use of Pipes. Explain how messaging through an ordinary pipe is analogous to well-known producer-consumer style of communication [2]

Ordinary Pipes allow communication in a standard producer-consumer style. producer writes to one end, and the consumer reads from the other. It allows only unidirectional flow（FIFO）. We'll need two ordinary pipes for 2-way. Ordinary pipes on Windows systems are referred to as Anonymous pipes, and the communicating processes have a parent-child relationship These can be used only for communication between processes on the same machine. Once processes finish, ordinary pipes don't exist.
The chat system used on the World Wide Web is an example of pipe use. The client delivers a message to the server, and the server receives it and sends it back to the client via the same named pipe.