Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India
(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination

March 2020

Max. Marks: 20
Class: S.E.

Duration:1 Hr.
Semester: IV
Branch:
IT/Comps.

Course Code:IT44/CE43
Name of the Course: Operating Systems

Instruction:
(1) All questions are compulsory
(2) Draw neat diagrams
(3) Assume suitable data if necessary

Q. No.		Max. Marks	CO-BL-PI

1 a)	What will be the output of the following code and why?
	#include <stdio.h>
	#include <sys/types.h>
	#include <sys/wait.h>
	#include <unistd.h>
	int main(int argc, char* argv[])
	{
	
	if (fork()==0)
	{
	printf("hello");
	exit(0);
	}
	else
	{
	wait(0);
	printf("world");
	}
	}
	Solution: /* oslab@oslab-OptiPlex-390:~$ cd Desktop/
	
	oslab@oslab-OptiPlex-390:~/Desktop$ gcc f.c
		2	1-2-2.4.2

	f.c: In function 'main': f.c:11:4: warning: implicit declaration of function 'exit' [-Wimplicit-function-declaration] exit(0); ^ f.c:11:4: warning: incompatible implicit declaration of built-in function 'exit' f.c:11:4: note: include '<stdlib.h>' or provide a declaration of 'exit' oslab@oslab-OptiPlex-390:~/Desktop$ ./a.out helloworldoslab@oslab-OptiPlex-390:~/Desktop$ ^C oslab@oslab-OptiPlex-390:~/Desktop$		
b)	Explain any two function of operating systems. An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.	2	1-2-2.2.2
c)	Explain booting in detail. When the computer is turned on or restarted, the bootstrap loader first performs the power-on self-test, also known as POST. If the POST is successful and no issues are found, the bootstrap loader will load the operating system for the computer into memory. The computer will then be able to quickly access, load, and run the operating system	2	1-2-2.2.2
2 a)	Calculate the predicted burst time using exponential averaging for the fifth process if the predicted burst time for the first process is 10 units and actual burst time of the first four processes is 4, 8, 6 and 7 units respectively. Given $\alpha = 0.5$. Ans : 6.875	2	2-3-2.4.1

<table>
<tr>
<td>b)</td>
<td>
Consider the following set of processes, with the arrival times and the CPU burst times given in milliseconds.
What is the average turnaround time AND waiting time for these processes with the shortest remaining time first (SRTF) algorithm?
<table>
<tr><th>Process</th><th>Arrival time</th><th>Burst time</th></tr>
<tr><td>P1</td><td>0</td><td>5</td></tr>
<tr><td>P2</td><td>1</td><td>3</td></tr>
<tr><td>P3</td><td>2</td><td>3</td></tr>
<tr><td>P4</td><td>4</td><td>1</td></tr>
</table>
Ans: 5.50
OR
Consider the set of 5 processes whose arrival time and burst time are given below. If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turn around time. (Note : Higher number represents higher priority)
<table>
<tr><th>Process</th><th>Arrival time</th><th>Burst time</th><th>Priority</th></tr>
<tr><td>P1</td><td>0</td><td>4</td><td>2</td></tr>
<tr><td>P2</td><td>1</td><td>3</td><td>3</td></tr>
<tr><td>P3</td><td>2</td><td>1</td><td>4</td></tr>
<tr><td>P4</td><td>3</td><td>5</td><td>5</td></tr>
<tr><td>P5</td><td>4</td><td>2</td><td>5</td></tr>
</table>
Ans:
Average Turn Around time = (4 + 14 + 10 + 6 + 7) / 5 = 41 / 5 = 8.2 unit
Average waiting time = (0 + 11 + 9 + 1 + 5) / 5 = 26 / 5 = 5.2 unit
</td>
<td>5</td>
<td>2-3-2.4.1</td>
</tr>
<tr>
<td>3a)</td>
<td>
The following two functions P1 and P2 that share a variable B with an initial value of 3 execute concurrently. The number of distinct values that B can possibly take after the execution is? Justify your answer.
P1( )
{
C=B-1;
B=2*C;

P2( )
{
D=2*B;
B=D-1;
</td>
<td>4</td>
<td>3-3-2.4.1</td>
</tr>
</table>

	} Ans:4 }		
Q.3.b)	What is critical section? Explain the requirements of critical section problem. Ans : Critical Section is the part of a program which tries to access shared resources. That resource may be any resource in a computer like a memory location, Data structure, CPU or any IO device. Mutual Exclusion Progress Bounded Waiting	2	3-3-2.2.2
Q.3.c)	A counting semaphore S is initialized to 10. Then, 6 P operations and 4 V operations are performed on S. What is the final value of S? Ans: 8	1	3-3-2.4.1