Roll Number: 101701003

Thapar Institute of Engineering and Technology, Patiala
Department of Computer Science and Engineering

B.E. (COE/ENC) 2nd year

Course Code: UCS 303
Course Name: Operating Systems
Friday, 10:30 – 12:30 Hrs

September 28, 2018
Time: 2 Hours, M. Marks: 25
Mid Semester Test

Name Of Faculty: VIK, AKM, RKG, TBH, SKT, RJK, NKK, AMP

Note: Attempt all questions in proper sequence. Assume missing data, if any, suitably.

No.		Description	Marks
1	A	What is multiprogramming? What are the factors that need to be considered to determine the degree of multiprogramming in a system?	1+1
	B	What are advantages and disadvantages of virtual machines?	1+1
	C	(see code below) How many times "5" will be printed in the above program? Explain your answer with appropriate justification on every fork system call (can be explained through diagram).	1+4
2		Answer each of the following questions briefly (in one or two sentences)	1+1+1 +3=6
	A	Under what conditions does FIFO scheduling result in the shortest possible average response time?	
	B	Under what conditions does round robin scheduling behave identically to FIFO?	
	C	Under what conditions does round robin scheduling perform poorly compared to FIFO?	
	D	What scheduling policy will you use for each of the following cases? Explain your reasons for choosing them.	

Question 1 C code:

```c
#include <stdio.h>
#include <unistd.h>
int main()
{
    if (fork() || fork() && fork())
    {
     if (fork() || fork())
     {
       fork();
     }

    }

     fork();
    printf("5 ");
    return 0;
}
```

Question 2 D:

1. The processes arrive at large time intervals:
2. The system's efficiency is measured by the percentage of jobs completed.
3. All the processes take almost equal amounts of time to complete.

3	A	Explain process control block with diagram.	1+1=2
	B	Why do monolithic operating systems tend to be efficient? What is a key weakness of monolithic kernels?	1+1=2
	C	Consider a system have five processes P0 through P4 and four resources types A, B, C, D. Suppose at time T following snapshot of the system has been taken:	1+2+3 =6

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using Banker's algorithm:

a) What are the contents of matrix *Need* ?

b) Is the system in a safe state ?

c) If a request from process P_1 arrives for (0, 4, 2, 0), can the request be granted immediately ?