Philadelphia University Faculty of Engineering Department of Computer Engineering		Date:- 05/04/2016 Allowed time:- 60 minutes

Operating Systems (630422) First Exam

Student Name: - ……..... ID: - ……

Question 1: chose the correct answer for the following: 4 points

1- Which of the following statements is incorrect?
A) An operating system provides an environment for the execution of programs.
B) An operating system manages system resources.
C) Operating systems provide both command line as well as graphical user interfaces.
D) Operating systems must provide both protection and security.

2- The list of processes waiting for a particular I/O device is called a(n) ____.
A) standby queue B) device queue C) ready queue D) interrupt queue

3- When a child process is created, which of the following is a possibility in terms of the execution or address space of the child process?
A) The child process runs concurrently with the parent.
B) The child process has a new program loaded into it.
C) The child is a duplicate of the parent.
D) All of the above

4- In a(n) _____ temporary queue, the sender must always block until the recipient receives the message.
A) zero capacity B) variable capacity C) bounded capacity D) unbounded capacity

Question 2: Explain the rule of System Calls . 2 points.

Programming interface to the services provided by the OS. The system call interface invokes the intended system call in OS kernel and returns status of the system call and any return value

Question 3: What is Process Control Block (PCB). 2 point

PCB is a block of Information associated with each process that contains information such as Process state – running, waiting, etc, Program counter, CPU registers, CPU scheduling information- priorities, scheduling queue pointers, Memory-management information, Accounting information, I/O status information.

Question 4: What are the main characteristics of Micro Kernel system structure, and what is the main disadvantage of this model. 3 points

1- **Moves as much from the kernel into user space**
2- **Communication takes place between user modules using**

Disadvantage

Performance overhead of user space to kernel space communication

Question 5: What is the functionality of Core Dump file and crash dump file in operating system debugging. **2 points.**

Core dump file generated when Failure of an application to capture memory of the process

Crash dump file generated when Operating system failure containing kernel memory

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Question 6: If a process is in running state, what states it can move in to and when. **3 points.**

1- **Waiting State when I/O event occur.**
2- **Ready State when OS interrupt occur.**
3- **Terminated State when exit command is executed.**

Question 7: Using the programs bellow identify the output of the parent process and the output of the child process (Assume that the actual pid of the parent process is 2600 and the pid for child process is 2603, function getpid() return the current process pid.) **4 points**

```
#include <sys/types.h>
#include <iostream.h>
#include <unistd.h>
int main()
{
Pid_t pid, pid1;
pid = fork();
if (pid < 0)
{     cout<<"Fork Failed\n";
      return 1;
      }
      else
      if (pid == 0)
      {
      execlp("/home/usr/p1","p1",NULL);
      }
      else
      {
      execlp("/home/usr/p2","p2",NULL);

      }
return 0;
}
```

```
/home/usr/p1
#include <sys/types.h>
#include <iostream.h>
#include <unistd.h>
int main()
{
      pid_t pid=getpid();
      cout<<"pid="<<pid<<endl;
      for(int i=0;i<5;i++)
            cout<<i<<" ";
return 0;
}
      /home/usr/p2
#include <sys/types.h>
#include <iostream.h>
#include <unistd.h>
int main()
{
      pid_t pid=getpid();
      cout<<"pid="<<pid<<endl;
      for(int i=4;i>=0;i--)
            cout<<i<<" ";
return 0;}
```

Parent Process output

PID=2600
4 3 2 1 0

Child Process output

PID=2603
0 1 2 3 4