System Calls and Threads

1) Which of the following is FALSE ?

A) Threads are cheaper to create than processes
B) Threads are cheaper to context switch than processes
C) A blocking user-level thread blocks the process
D) System calls do not change to privilege mode of the processor

2) Consider the following code which invokes the fork system call.

```
char string1[] = "Hello";
char string2[] = "World";

int main( ) {
if (fork()==0)
  printf("%s", string2);
else
     printf("%s", string1);
return 0;
}
```

Which of the following statement(s) is/are correct? **[MSQ]**
A) The parent process prints “Hello”.
B) The child process prints “Hello”.
C) The parent process prints “World”.
D) The child process prints “World”.

3) The output of the following program is :

```
int main() {
    fork();
    fork();
    printf("Hello");
    return 0;
}
```

A) Hello
B) Hello Hello
C) Hello Hello Hello
D) Hello Hello Hello Hello

4) How many child processes are created with following code :_____________ **[NAT]**

```
int main() {
    fork();
    if(fork()==0)
       if(fork() != 0){
          printf("GATE EXAM 2022");
       }
    return 0;
}
```

5) Which of the following are correct about Threads? **[MSQ]**

A) A thread has no data segment.
B) Each thread has its own stack.
C) There can be more than one thread in a process.
D) Each thread has its own heap.

6) Which of the following information about the process is identical for a parent and the newly created child processes, immediately after the fork system call?
A) The process id (PID)
B) The file descriptor (fd) opened by the parent.
C) Both of these.
D) None of these.

7) Which of the following are correct about Threads? **[MSQ]**

A) Threads in a process can execute different parts of the program code at the same time.
B) Threads can also execute the same parts of the code at the same time, but with different execution state.
C) Processes start out execution with a single main thread.
D) A thread can also create new threads.

8) Whenever there is a need to switch between the threads of the same process, the context of a thread will be saved and restored in the form of

A) code, data, and stack

B) code, CPU registers, and stack

C) PC, CPU registers, and stack

D) None

9) Consider the following code :

```
     for(i=0; fork() ; i++)
              if(i==n) break;
```

How many times the fork statement is called ?

A) 2^(n+1)

B) 2^n

C) n

D) n+1

10) Which of the followings is TRUE about threads?
A. Different threads share the same heap.
B. Different threads share the same stack.
C. Different threads share the same Program Counter (PC).
D. None of them.

11) Which of the followings are true about the relationship between kernel and user level threads?
(I) Both of them are faster to create than creating a process
(II) When a kernel level thread execute an I/O system call, the other kernel threads within the same process are blocked as well.
(III) When a user level thread execute an I/O system call, the other user threads within the same process are blocked as well.
A. I only.
B. I and II. C. I and III.
D. I, II and III.

12) Select the correct statement(s) from the following **[MSQ]**

A) Each thread has their own program counter, stack and set of registers.
B) Threads share common code, data, and certain structures such as open files.
C) Processes have a single thread of control.
D) A thread is a basic unit of CPU utilization, also called a lightweight process.

13) What is the purpose of the fork() system call in Unix-like operating systems?

A) To terminate a process
B) To create a new process
C) To read data from a file
D) To write data to a file

Solution: B) To create a new process
Explanation: The fork() system call is used to create a new process by duplicating the existing process.

14) Which system call is used to terminate a process in Unix-like operating systems?

A) fork()
B) exec()
C) getpid()
D) exit()

15) What system call is used to open a file in Unix-like operating systems?

A) open()
B) close()
C) read()
D) write()

16) Which of the following system calls is used to read data from a file in Unix-like operating systems?

A) read()
B) write()
C) getpid()
D) fork()

17) What is the purpose of the getpid() system call in Unix-like operating systems?

A) To create a new process
B) To retrieve the process ID of the calling process
C) To open a file
D) To terminate a process

18) Which system call is used to allocate a contiguous block of memory in Unix-like operating systems?

A) malloc()
B) free()
C) mmap()
D) brk()

19) What is the purpose of the free() system call in memory management?

A) To allocate memory
B) To deallocate memory
C) To map files into memory
D) To change the size of the data segment

20) Which system call is used to change the size of the data segment in Unix-like operating systems?

A) sbrk()
B) mmap()

C) munmap()
D) brk()

21) Which of the following is a benefit of using threads in a program?

A) Increased process isolation
B) Reduced concurrency
C) Improved responsiveness
D) Simplified resource management

22) Identify the correct statement?

A) User-level threads are managed by the kernel, while kernel-level threads are managed by user-space libraries.
B) User-level threads have their own execution context, while kernel-level threads share the same execution context.
C) User-level threads are more efficient than kernel-level threads.
D) Kernel-level threads have higher priority than user-level threads.

23) What is the primary advantage of User-Level Threads (ULT) over Kernel-Level Threads (KLT)?

A) ULTs provide better concurrency
B) ULTs are easier to implement
C) ULTs have lower context-switching overhead
D) ULTs have higher priority than KLTs

24) Which of the following is true regarding Kernel-Level Threads (KLT)?

A) Each KLT has its own program counter
B) KLTs are managed entirely by user-space libraries
C) KLTs provide better application isolation
D) KLTs are created and managed by the operating system kernel