

Answer the following questions:

1. State true or false.

- a) When a new process is scheduled for execution, a process called as *context switch* is followed by the OS which involves **storing the state of the running process**, so that it can be restored for resuming execution at a later point.

Answer: True

- a) A program is an active entity.

Answer: False

- b) Heap segment of a program occupies a fixed space in memory as a program runs.

Answer: False

- c) Ready queue is the set of all processes residing in main memory, ready and waiting to execute.

Answer: True

- d) The `init` process, which is the parent of all processes in a Linux system, has a process ID of 1.

Answer: True

2. Name the Linux command that is used to list the system calls that are invoked by a process.

Answer: `strace`

3. List three scenarios when a process enters a `waiting` state.

Answer:

- a) When the process needs to wait for an input
- b) When the CPU time slice expires and the next process needs to be given the CPU
- c) An interrupt occurs

4. Complete the following program by adding suitable code segments in the three `switch case` blocks as defined below:

- a) Case `-1`: Display error message and `exit` from the program
- b) Case `0`: Use `exec` system call to execute the `ps -A` command.
- c) Default: Wait for the termination of the child process and then display process IDs of both parent and the child.

```
int main()
{
    int pid; int rv;
    pid=fork();

    switch(pid){
    case -1:

        /* 1. code for case -1 */

    case 0:

        /* 2. code for case 0 */

    default:

        /* 3. code for default case */

    }}
}
```

Answer:

1. `printf("Error with fork");`
`exit(1);`
2. `execl("/bin/ps", "ps", "-A", NULL);`
3. `wait(NULL);`
`printf("Parent ID %d, Child ID %d", getpid(), pid);`