Draw the process hierarchy for the given code fragment. 6 marks

```
int main()
{
pid_t pid;
int i;
cout << "My process id = " << getpid() << endl;
for(i=1 ; i <= 10 ; i++)
{
pid = fork();
 if(pid)
        {
   break;
        }
 cout << "Child #" << getpid() << endl;
}
 wait(NULL);
 return 0;
}
```

1) Give an example where making a system call will decrease the system performance. 3 marks
2) What do you understand by the term starvation of a process? Which scheduling algorithm may result in starvation of process? 6 marks
3) Identify two events which causes to switch from user mode to kernel mode. 4 mark
4) Estimate CPU utilization if long term scheduler favors all I/O bound processes. 3 marks
5) How many processes will be in a running state on a single core uniprocessor at any given time?
6) Differentiate between long term, medium term and short term schedulers. How do these affect the degree of multiprogramming? 5 marks
7) What do you understand by the cascading termination of processes? 3 mark
8) Differentiate between preemptive and non-preemptive scheduling algorithm. 3 marks
9) Differentiate between monolithic and micro kernel structure of operating system. 3 marks
10) Explain briefly the concept of virtual machine. What are the major benefits that can be gained with the usage of virtual machine? Give an example to illustrate. 5 marks
11) How your computer will perform jobs in a bare operating system? 2 marks
12) Refer to the following table gives the arrival time, next CPU burst of the ready processes in the system.

PROCESS	CPU-BURST	ARRIVAL TIME
P0	4	0
P1	10	1
P2	4	2
P3	5	3
P4	7	4
P5	8	5

1. Give the gantt chart for the above using each of the following scheduling algorithm
   a) FCFS 4 marks
   b) SJF(preemptive) 5 marks
2. Calculate the average waiting time for each of the above algorithms showing all your calculations. 8 marks