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Quiz 4

— (BSE-5B) —

Course: Operating Systems	Course Code: CS 2006
Section: BSE-5B	Total Marks:10
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Question 1: **[10 Marks]**

In a shared office environment, multiple users send print jobs to a single printer. The printer can handle only one print job at a time, and jobs are processed in the order they arrive. However, the printer queue has a maximum limit of 10 jobs. Design a solution using **binary and counting semaphores** to manage the printer queue so that:

- New print jobs wait if the queue is full.
- Only one print job is processed by the printer at a time.

Use Queue

You have to create a queue for jobs and you can assume that there are two functions sendPrintJob(int job_id) (which will be called every time a new job is created) and processPrintJob() (which is running in a while loop and printing jobs) that are used, you need to define these functions, on successful entry to the queue you will print the massage (e.g. "job 24 is added to queue") and when job is running on the printer you can print massage (e.g. "job 16 is running").

```
#include <queue.h>
#include <iostream>
using namespace std;

Semaphore mutex = 1, full=0, empty= 10;
static queue<int> q = new queue<int>();
```

mutex is binary

full & empty are counting semaphores

```
void ProcessPrintJob () {
while(true)
{
        wait(full);          ✓
        wait(mutex);         ✓
    if (q.size() != 0)
    { int val = q.pop();
        cout<< "job "<< val << "is running"<< endl;
    }
        signal (mutex);
        signal(empty);
```

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? ?

```
void sendPrintJob(int jobID){
  while(true){
          wait(empty);        ✓
          wait(mutex);
           if(q.size() !=10)
        {q.push("jobID);
          cout << "job"<<jobID<<"is added to queue"<<endl;
        }
          signal(mutex);   ✓
          signal(full);    ✓
                5
  }
}
```