

#Part 2 java monitor

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##Compile:
use eclipse or javac

##Run:
Main class

##Description:

This is the second part of the lab2, here we will use monitor to do the same program as the Semaphores will do. In this part we will use java to implement this part. We are requested to have one producer and many consumers. And the producer will produce the requests, and consumers will get the requests, and execute the requests.

####Request.java:

This file have a class which is called Request, this class have constructor which will take one argument which is called ID, and this will represent the id of the request. We will use this class to create the requests. Then we have length and ID variables:

length: This will be the length of the requests. ID: This represents the id of the requests.

There is also one method:

length(): This will return the length of the request, in the function, we use the Random to create the random length of the request.
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####Consumer.java:

This file will implement the consumer, in this consumer class, there is constructor which will take two arguments, one is ID which will represents the ID of the consumer, the other one

is producer, which will produce the request for this consumer. And the class consumer will extends Thread

So the consumer can become a thread. Then we override the run function, in the run function, first we get

the ID and assign it to this consumer thread, the we use producer's getRequest to get the request, then process the request, finally we print out the output of the programs with the real time of the machine.

####Producer.java:

This file will implement the producer. There is a class called Producer which will extends Threads, so that the producer can be the thread. In this class, we have some arguments which are

private

so that other class may not access it. The variables:

```
MAX_REQUEST: int, this will represent the max number of requests in the queue
sleep_time: int , this will represent the time for producer to sleep after
creating a request. This is also final variable so that we can not change it
total_count: int, this will represent the count for requests in total. This is
also final variable so that we can not change it
count: int, this will represent the count for requests in total
max: int, this will represent the max number of requests in total
queRequests: Queue<Request>, this will represent the queue of the request.
```

Then we have a constructor which will take three arguments, one is input which will represent max number of

requests we will create and we will assign it to MAX_REQUEST. Second one is called sleep_time, which will

represent the time the producer will sleep after creating a new request, and we will assign it to sleep_time.

The third one is called max, this will represent the max number of requests in total so we can assign it to max

Then we Override the run function and in this function, we have a while loop, if the total_count is less than max

which means the queue is not full so we put the request in the queue and increase the total_count and count.

And also we have some synchronized method:

```
putRequest: This method is void. In the function, first we will check whether
the queue is full, if it is full,
    we will wait, if not we will create a new request and give the id which is
total_count, then we add the request
    in the queue. Then we get new real time of the machine, then print out the
output of the program. After that we
    will sleep the producer for the sleep_time. Then we notify other waiting
threads.
```

```
getRequest: This method will return Request type. In the function first we will
create the request, and then notify
    the waiting thread. if the queue is empty then we need to wait. Then after
check those things, we will take the
    first request from the request queue, then we decrease the count because
one of the request is out. then we get
    the length of the request by call length method of request. After that we
get the real time of the machine and print
    out the output of the program.
```

Then we have a method called consumer which will return the array of the consumer. This method is not synchronized.

This method will take two arguments which are input and producer. The input will indicates how many consumers we will have

and producer is the producer which will produce the request for the consumer. In the method, we

will create an array, and
then we use a for loop to create consumers and put each new consumer in the array. Then we will return the consumer array.

####Main.java:

This file have a main class where we will create producer to run the whole program. In the main function, first we

create new producer which will take 10,1000,20 as input, 10 is max requests number in the queue, 1000 means 1 second for

each sleep, 20 means 20 max requests in total. Then we run the producer, and then we use consumer to create 5 consumers.