

Lab 10 Semaphores

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786

Task 1:

Write a program to implement this scenario:

There is a water filter which is adding 10L water in one second/iteration and five persons that are getting water from filter each person getting 5L in one second/iteration.

Implement this using Semaphores.

First solve with binary semaphore then you can consider that three persons can take water at the same time

Answer:

Code 1:

```

#include<stdio.h>
#include<stdlib.h>
#include<signal.h>
#include<pthread.h>
#include<semaphore.h>
#include<unistd.h>

sem_t sem;
int value = 10;
void *my_fun ( void *arg ){
    sem_wait(&sem);
    value = value - 5;

    sleep(1);
    value = value + 10;
    sem_post(&sem);

    printf("\n Adding 10 liter water and removing 5 liter: %d liter ",value);

    pthread_exit (NULL) ;
}

int main(){
    pthread_t tid [5];
    sem_init(&sem , 0 , 1 );
    printf("Statring threads...\n");
    for (int i =0; i <5; i ++){
        pthread_create(& tid[i] ,NULL ,my_fun,NULL);
    }

    pthread_exit (NULL);
}

```

Execution Visually:

```
spoofy@spoofy-Precision-M4600: ~/Downloads/semaphore-t...  
spoofy@spoofy-Precision-M4600:~/Downloads/semaphore-task$ gcc task.c -o task -pthread  
spoofy@spoofy-Precision-M4600:~/Downloads/semaphore-task$ ./task  
Statring threads...  
  
Adding 10 liter water and removing 5 liter: 15 liter  
Adding 10 liter water and removing 5 liter: 20 liter  
Adding 10 liter water and removing 5 liter: 25 liter  
Adding 10 liter water and removing 5 liter: 30 liter  
Adding 10 liter water and removing 5 liter: 35 liter spoofy@spoofy-Precision-M4600:~/Downloads/semaphore-task$
```

Code 2:

```
#include<stdio.h>  
#include<stdlib.h>  
#include<signal.h>  
#include<pthread.h>  
#include<semaphore.h>  
#include<unistd.h>  
  
sem_t sem;  
int value = 10;  
void *my_fun ( void *arg ){  
    int i = 1 , x;  
    sem_wait(&sem);  
    sem_getvalue(&sem , &x) ;  
    value = value - 5;  
    sleep(1);  
    value = value + 10;  
    printf("\n Adding 10 liter water and removing 5 liter: %d liter ",value);  
    pthread_exit(0);  
}  
  
int main(){  
    int x, i;  
    pthread_t tid [5];  
    sem_init(&sem , 0 , 3 );  
    printf("Statring threads...\n");  
    for (i =0; i <5; i ++){  
        pthread_create(& tid[i] , NULL,my_fun,NULL);  
    }  
}
```

```

    sleep(2);
    printf ( "\nMain : Going to Post");
    sem_post(&sem );
    sem_getvalue(&sem , &x);
    sleep(5);

    printf( "\nMain : Going to Post" );
    sem_post(&sem);
    sem_getvalue(&sem , &x );
    pthread_exit(0);
}

```

Execution Visually:

```

spoofy@spoofy-Precision-M4600: ~/Downloads/semaphore-t...
spoofy@spoofy-Precision-M4600:~/Downloads/semaphore-task$ gcc task2.c -o task2 -pthread
spoofy@spoofy-Precision-M4600:~/Downloads/semaphore-task$ ./task2
Statring threads...

Adding 10 liter water and removing 5 liter: 5 liter
Adding 10 liter water and removing 5 liter: 15 liter
Adding 10 liter water and removing 5 liter: 25 liter
Main : Going to Post
Adding 10 liter water and removing 5 liter: 30 liter
Main : Going to Post
Adding 10 liter water and removing 5 liter: 35 liter spoofy@spoofy-Precision-M4
600:~/Downloads/semaphore-task$

```

FIN...