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Lab 8:
PThreads in OS

Programme	:	**BTech. CSE Core**	Semester	:	**Win 2021-22**
Course	:	**Operating Systems**	Code	:	**CSE2005**
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Date: 08-04-2022 LAB 08 PThreads in OS

LAB 8

1. Create threads and print process id and thread id.

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

void *print( void *ptr );
int main(){
pthread_t thread1, thread2;
char *msg1 = "Operating System Hariket 1";
char *msg2 = "Operating System Hariket 2";
int  p1, p2;

p1 = pthread_create( &thread1,  NULL, print, (void*) msg1);
p2 = pthread_create( &thread2, NULL, print, (void*) msg2);

pthread_join(thread1, NULL);
pthread_join(thread2, NULL);

exit(0);
}
void *print( void *ptr ){

char *message;
message = (char *) ptr;
printf("%s \nThread ID: %lu\nProcess ID: %d\n", message, pthread_self(), getpid());

}
```

OUTPUT:

```
Operating System Hariket 2
Thread ID: 140419184862976
Process ID: 4498
Operating System Hariket 1
Thread ID: 140419193255680
Process ID: 4498


...Program finished with exit code 0
Press ENTER to exit console.
```

2. Write a program that creates 5 threads. Have each thread execute the same function and pass each thread a unique number. Each thread should print “Hello, World (thread n)" five times where n is replaced by the thread's number. Use an array of pthread_t objects to hold the various thread IDs. Be sure the program doesn't terminate until all the threads are complete.

```c
#include <stdio.h>
#include <pthread.h>

const int numberOfThreads = 5;
const int numberOfPrints = 5;

void* showThreadNumber(void* _number)
{
    int number = *(int*)_number;
    for( int i = 0 ; i< numberOfPrints ;i++)
    {
        printf("Hello, World. Thread: %d\n", number+1);
    }
    return NULL;
}

int main(){

    pthread_t threads[numberOfThreads];

    int number[numberOfThreads];
    for(int i =0;i<numberOfThreads;i++)
        number[i] = i;


    for(int i = 0 ;i< numberOfThreads;i++){
        if( pthread_create(&threads[i] , NULL ,showThreadNumber,&number[i]) )
            printf("Thread Number %d fail!!\n" ,number[i]);
    }

    for(int i = 0 ;i< numberOfThreads;i++)  {
        pthread_join(threads[i],NULL);
    }

    return 0;
}
```

Name: Hariket Sukesh Kumar Sheth Register No.: 20BCE1975

OUTPUT:

```
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 2
Hello, World. Thread: 2
Hello, World. Thread: 2
Hello, World. Thread: 2
Hello, World. Thread: 2
Hello, World. Thread: 1
Hello, World. Thread: 1
Hello, World. Thread: 1
Hello, World. Thread: 1
Hello, World. Thread: 1
```

```
Hello, World. Thread: 1
Hello, World. Thread: 1
Hello, World. Thread: 2
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 5
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 4
Hello, World. Thread: 1
Hello, World. Thread: 1
Hello, World. Thread: 1
Hello, World. Thread: 2
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 3
Hello, World. Thread: 2
Hello, World. Thread: 2
Hello, World. Thread: 2
Hello, World. Thread: 3
```

3. Create two threads and print your register number 50 times in one thread and your first name 50 times in the other thread. If the output is not ordered do the necessary change in your code to order register number 50 times followed by name 50 times.(synchronisation)

```c
#include <stdio.h>
#include <pthread.h>

const int numberOfThreads = 2;
const int numberOfPrints = 50;

void* execute(void* _number)
{
    int number = *(int*)_number;
    if(number==1){
        for( int i = 0 ; i< numberOfPrints ;i++){
            printf("Register Number: 20BCE1975. Thread Number: %d\n", number);
        }
    }
    else{
        for( int i = 0 ; i< numberOfPrints ;i++){
            printf("First Name: Hariket. Thread Number: %d\n", number);
        }
    }

    return NULL;
}

int main(){

    pthread_t threads[numberOfThreads];

    int number[numberOfThreads];
    for(int i =0;i<numberOfThreads;i++)
        number[i] = i+1;


    for(int i = 0 ;i< numberOfThreads;i++){
        if( pthread_create(&threads[i] , NULL , execute,&number[i]) )
            printf("Thread Number %d fail!!\n" ,number[i]);
    }

    for(int i = 0 ;i< numberOfThreads;i++)  {
        pthread_join(threads[i],NULL);
    }

    return 0;
}
```

OUTPUT:

```
Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
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Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
Register Number: 20BCE1975. Thread Number: 1
```

```
First Name: Hariket. Thread Number: 2
First Name: Hariket. Thread Number: 2
First Name: Hariket. Thread Number: 2
First Name: Hariket. Thread Number: 2
First Name: Hariket. Thread Number: 2
First Name: Hariket. Thread Number: 2
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