

Assignment Project Exam Help

Pthreads

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Anandha Gopalan

November 24th 2017

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What are Pthreads?

- POSIX (Portable Operating System Interface) Threads

- Implementation depends on the system

- Implemented as a library on POSIX compliant Unix systems
→ libpthread

- Since Kernel version 2.6, implemented in Linux as the Native POSIX Thread Library ⇒ 1-1 relationship between threads created and kernel threads

- Provides APIs for creating and managing threads

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

```
int pthread_create (pthread_t *thread, const pthread_attr_t *attr,  
void *(*start_routine)(void *), void *arg)
```

pthread_create (ID, Attributes, Function Pointer, Argument)

- ID → ID of newly created thread (set by the system)
- Attributes → Generally set to NULL for default attributes
- Function Pointer → Pointer to the function which will be executed by the newly created thread
- Argument → Argument to the Function

Create and pass parameters (Example from CW)

Pass address of producerid so that we get id of thread created back

```
pthread_t producerid;  
int parameter = 5;  
pthread_create (&producerid, NULL, producer,  
               (void *) &parameter);
```

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Have to cast to correct data type in function

```
void *producer (void *parameter)  
{  
    int *param = (int *) parameter;  
    cout << "Parameter = " << *param << endl;  
    pthread_exit(0);  
}
```

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How do we create multiple threads?

Hint: Using an array to hold multiple thread IDs

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How do we pass multiple parameters?

Can use global variables

Hint: Using structures \Rightarrow `struct` data type declaration and passing the structure as a parameter is a more elegant solution

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Exit from Thread

```
#include <pthread.h>
void pthread_exit (void *retval)
pthread_exit (0);
```

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Wait for thread to finish and exit main programme

```
#include <pthread.h>
int pthread_join (pthread_t thread, void **retval)
pthread_join (producerid, NULL);
```