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11. Illustrate the concept of multithreading using a C program.

**Aim:**

To illustrate the concept of multithreading in C, where multiple threads are executed concurrently.

**Algorithm:**

1. Initialize the main thread.
2. Create additional threads using `pthread_create()`.
3. Each thread executes a function.
4. The main thread waits for all threads to finish using `pthread_join()`.
5. The threads perform a task, and the main thread handles the synchronization.

**Procedure:**

1. Include the necessary header for pthreads: `<pthread.h>`.
2. Define a function that will be executed by each thread.
3. Use `pthread_create()` to create new threads.
4. Use `pthread_join()` to ensure the main thread waits for the other threads to finish.
5. Display a message from each thread and the main thread to show parallel execution.

**Code:**

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

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

```
void* print_message(void* thread_id) {
```

```
    long tid = (long)thread_id;
```

```
    printf("Hello from thread %ld\n", tid);
```

```

        return NULL;
    }

int main() {
    pthread_t threads[3];
    long t;

    for (t = 0; t < 3; t++) {
        pthread_create(&threads[t], NULL, print_message, (void*)t);
    }

    for (t = 0; t < 3; t++) {
        pthread_join(threads[t], NULL);
    }

    printf("Hello from main thread\n");
    return 0;
}

```

**Output:**

The screenshot displays the OnlineGDB web interface. On the left is a blue sidebar with the OnlineGDB logo and navigation links: 'Create New Project', 'My Projects', 'Classroom' (marked as 'new'), 'Learn Programming', 'Programming Questions', 'Upgrade', and a 'Logout' button. The main area features a toolbar with icons for file operations and execution controls (Run, Debug, Stop, Share, Save). Below the toolbar, the console output is shown on a black background with white text. The output consists of four lines: 'Hello from thread 1', 'Hello from thread 2', 'Hello from thread 0', and 'Hello from main thread'. At the bottom of the console, a green message states: '...Program finished with exit code 0' and 'Press ENTER to exit console.'