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10. Illustrate the concept of inter-process communication using message queue with a C program.

Aim:

To demonstrate inter-process communication (IPC) using message queues in C. This allows processes to communicate with each other by sending and receiving messages.

Algorithm:

1. **Create a message queue:** Use `msgget()` to create a message queue.
2. **Send a message:** Use `msgsnd()` to send messages to the queue.
3. **Receive a message:** Use `msgrcv()` to receive messages from the queue.
4. **Remove the queue:** Use `msgctl()` to remove the message queue after use.

Procedure:

1. Initialize the message queue.
2. Send a message from the sender process.
3. Receive the message in the receiver process.
4. Clean up the message queue.

Code:

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

```
#include <sys/ipc.h>
```

```
#include <sys/msg.h>
```

```
#include <string.h>
```

```
struct message {
```

```
    long msg_type;
```

```
    char msg_text[100];
```

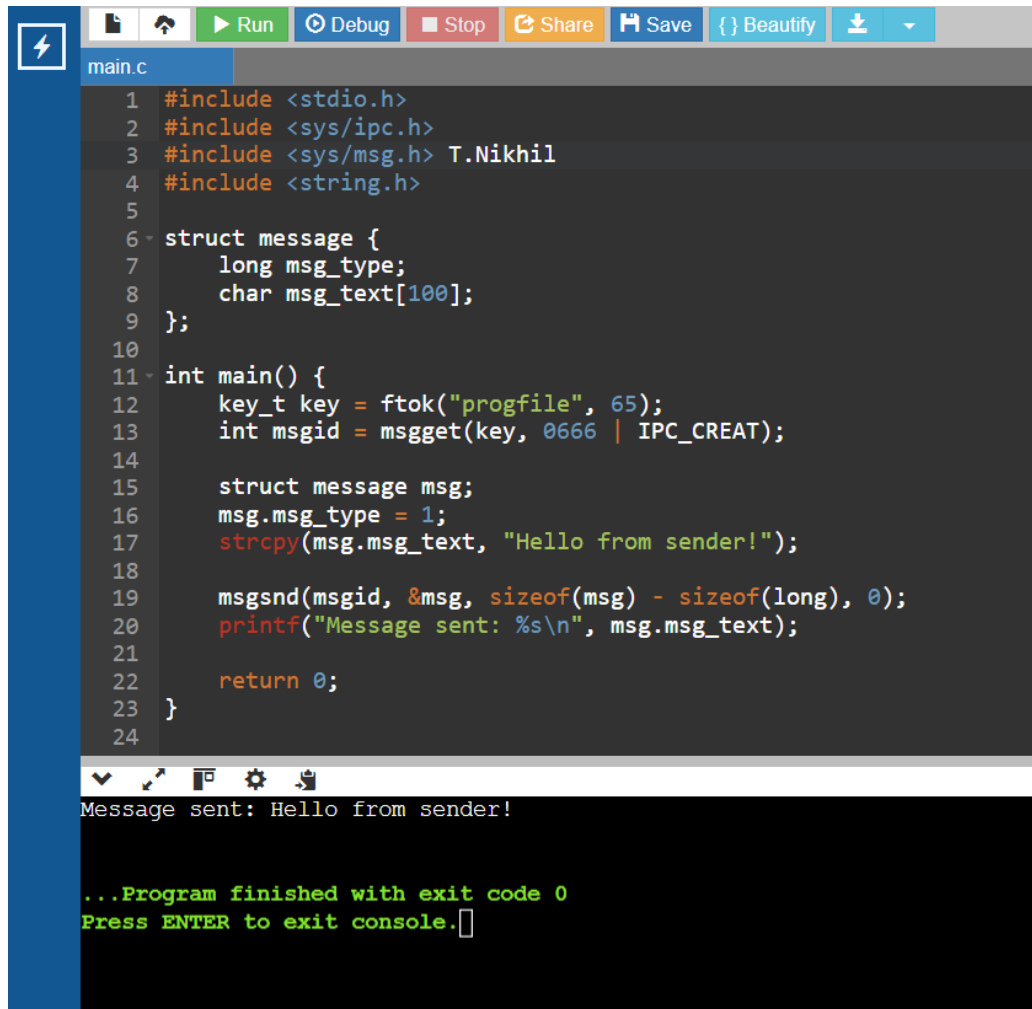
```
};
```

```
int main() {  
  
    key_t key = ftok("progfile", 65); // Generate unique key  
  
    int msgid = msgget(key, 0666 | IPC_CREAT); // Create message queue  
  
    struct message msg;  
  
    msg.msg_type = 1; // Message type (should be positive)  
  
    strcpy(msg.msg_text, "Hello from sender!"); // Message content  
  
    msgsnd(msgid, &msg, sizeof(msg) - sizeof(long), 0); // Send message  
  
    printf("Message sent: %s\n", msg.msg_text); // Confirm message sent  
  
    return 0;  
}
```

Result:

- The sender sends the message "Hello from sender!" to the message queue.
- The receiver receives the message and prints: Received message: Hello from sender!.

Output:



The image shows a code editor window with a toolbar at the top containing icons for Run, Debug, Stop, Share, Save, Beautify, and a download icon. The editor displays a C program in a file named `main.c`. The code defines a `message` struct and a `main` function that sends a message using `msgsnd` and prints it with `printf`. Below the code editor is a terminal window showing the output of the program.

```
1 #include <stdio.h>
2 #include <sys/ipc.h>
3 #include <sys/msg.h> T.Nikhil
4 #include <string.h>
5
6 struct message {
7     long msg_type;
8     char msg_text[100];
9 };
10
11 int main() {
12     key_t key = ftok("progfile", 65);
13     int msgid = msgget(key, 0666 | IPC_CREAT);
14
15     struct message msg;
16     msg.msg_type = 1;
17     strcpy(msg.msg_text, "Hello from sender!");
18
19     msgsnd(msgid, &msg, sizeof(msg) - sizeof(long), 0);
20     printf("Message sent: %s\n", msg.msg_text);
21
22     return 0;
23 }
24
```

Message sent: Hello from sender!

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