FACULTY OF SCIENCE COMPUTER AND MATHEMATICS

BACHELOR OF COMPUTER SCIENCE (HONS) NETWORKS

(CS 255)

NETWORK PROGRAMMING

(ITT 440)

INDIVIDUAL ASSIGNMENT

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Instructions:

You are required to create a fork program in C programming language. You are free to createas many child process as you wish for this program. You are free to create parent message and interrupt message. Your program should be capable of:

1. Forking into multiple child and there should be a kind of message passing from parent

to child(s) using pipe. (3 marks)

2. Parent process should get the message from user (keyboard entry). (3 marks)

3. Child(s) process should display the message (on screen / terminal). (3 marks)

4. If interrupt is detected from keyboard (Ctrl + C), the program should show appropriate

interrupt message. (3 marks)

CODING:

```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <signal.h>
#include <errno.h>
#include <sys/types.h>
#include <sys/wait.h>

#define TTL_LENGTH 4
#define TTL_WAIT_INTERVAL 3

void getTTL(char ttl[TTL_LENGTH + 1])
{
        srand (getpid() + getppid());
        ttl[0] = 49 + rand()%7;
        for (int i=1; i<TTL_LENGTH; i++)
        {
                ttl[i] = 48 + rand()&7;

        }
ttl[TTL_LENGTH] = '\0';
}

void sigint_handler(int sig);
int main(void)
{
```

```c
signal(SIGINT, sigint_handler);
while(1)
{
        int pipefds[2];
        char ttl[TTL_LENGTH + 1];
        char buffer [TTL_LENGTH + 1];
        char s[100];
        char string[100];
        pipe(pipefds);
        pid_t pid = fork();

        if(signal(SIGINT, sigint_handler) == SIG_ERR)
        {
                perror("signal");
                exit(1);
        }
        else if (pid == 0)
        {
                getTTL(ttl);
                close (pipefds[0]);
                write (pipefds[1], ttl, TTL_LENGTH + 1);

                printf ("\nWhat is the message: ");
                fgets (string, 100, stdin);
                printf ("Processing the message...\n");
```

```c
                    sleep(TTL_WAIT_INTERVAL);
                    printf("Sending the: %s", string);
                    sleep(TTL_WAIT_INTERVAL);
                    printf("Receiving the message... \n");
                    sleep(TTL_WAIT_INTERVAL);
                    exit(EXIT_SUCCESS);
              }
              else if (pid > 0)
              {
                    wait(NULL);
                    close (pipefds[1]);
                    read (pipefds[0], buffer, TTL_LENGTH + 1);
                printf ("The child receive '%d' and '%s' from parent. \n"
                        ,getpid(),buffer);
              }
        }
    return EXIT_SUCCESS;
}

void sigint_handler(int sig)
{
    printf ("INTERRUPTION ENCOUNTERED \n\n");
    exit(1);
}
```

OUTPUT:

THE OUTPUT BEFORE THE CTRL +C

```
aqeef@aqeef-VirtualBox:~$ nano assgn440.c
aqeef@aqeef-VirtualBox:~$ gcc -o assgn440.out assgn440.c
aqeef@aqeef-VirtualBox:~$ ./assgn440.out

What is the message: good morning
Processing the message...
Sending the: good morning
Receiving the message...
The child receive '4073' and '1' from parent.

What is the message: good afternoon
Processing the message...
Sending the: good afternoon
Receiving the message...
The child receive '4073' and '6' from parent.

What is the message: good night
Processing the message...
Sending the: good night
Receiving the message...
The child receive '4073' and '7' from parent.
```

THE OUTPUT AFTER CTRL + C

The interruption occurs

```
What is the message: ^CINTERRUPTION ENCOUNTERED

aqeef@aqeef-VirtualBox:~$ INTERRUPTION ENCOUNTERED
```