Assignement -4

1. **Basic Process Creation Objective: Understanding process creation using fork() in C.**

**Task:**

**● Write a C program that creates a child process using fork().**

**● Print the process IDs (PID) of both parent and child.**

**● Use getpid() and getppid() to display process details.**

**Expected Output:**

**● Display parent and child PIDs.**

**● Identify whether execution happens in the child or parent process.**

#include <stdio.h>

#include <windows.h>

int main()

{

    STARTUPINFO si;

    PROCESS\_INFORMATION pi;

    ZeroMemory(&si, sizeof(si));

    si.cb = sizeof(si);

    ZeroMemory(&pi, sizeof(pi));

    if (!CreateProcess(

            NULL,

            "cmd /c echo Child Process Running",

            NULL,

            NULL,

            FALSE,

            0,

            NULL,

            NULL,

            &si,

            &pi

            )){

        printf("Process creation failed. Error: %d\n", GetLastError());

        return 1;

    }

    printf("Parent Process:\n");

    printf("PID: %lu\n", GetCurrentProcessId());

    printf("Child Process Created (PID: %lu)\n", pi.dwProcessId);

    WaitForSingleObject(pi.hProcess, INFINITE);

    CloseHandle(pi.hProcess);

    CloseHandle(pi.hThread);

    return 0;

}

**Output :**

=thread-group-added,id="i1"

GNU gdb (GDB) 7.6.1

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This GDB was configured as "mingw32".

For bug reporting instructions, please see:

<http:*//www.gnu.org/software/gdb/bugs/>.*

Warning: Debuggee TargetArchitecture not detected, assuming x86\_64.

=cmd-param-changed,param="pagination",value="off"

=cmd-param-changed,param="args",value="2>CON 1>CON <CON"

[New Thread 68308.0xcbec]

[New Thread 68308.0xddfc]

Loaded 'C:\Windows\SysWOW64\kernel32.dll'. Symbols loaded.

Loaded 'C:\Windows\SysWOW64\KernelBase.dll'. Symbols loaded.

Loaded 'C:\Windows\SysWOW64\apphelp.dll'. Symbols loaded.

Loaded 'C:\Windows\SysWOW64\msvcrt.dll'. Symbols loaded.

[New Thread 68308.0xa054]

Child Process Running

Parent Process:

PID: 68308

Child Process Created (PID: 62164)

The program 'D:\OScript\Assignment4\pr\_1.exe' has exited with code 0 (0x00000000).

[Running] cd "d:\OScript\Assignment4\" && gcc pr\_1.c -o pr\_1 && "d:\OScript\Assignment4\"pr\_1

Child Process Running

Parent Process:

PID: 24500

Child Process Created (PID: 49416)

[Done] exited with code=0 in 3.093 seconds

1. **Process Synchronization Using wait() Objective: Understanding how a parent waits for a child process to finish execution.**

**Task:**

**● Modify the previous program to make the parent wait for the child to complete execution using wait()**

**● Print messages before and after the child process exits.**

**Expected Output:**

**● The parent should wait for the child to finish before printing its final message.**