Government Engineering College, Kishanganj

Department of Computer Science and Engineering

Assignment 01

Lab Duration: 2 Hours

OS Lab Programming Assignment on fork()

Problem Statement

Write a C program that utilises `fork()` to perform a distributed sum calculation on a dataset. The program must demonstrate sequential execution.

Requirements

1. **Array Initialisation :** Populate an integer array of size 30 with random values between 1 and 50.

2. **Sequential Execution:**

   - Create **Child 1** to calculate the sum of even integers in indices $0 - 14$.
   - The Parent must use `waitpid()` to ensure Child 1 completes before starting Child 2.
   - Create **Child 2** to calculate the sum of even integers in indices $15 - 29$.

3. **Data Retrieval:** Use `WEXITSTATUS` to collect the results from both children and print them from the Parent process.

Source Code Template

Complete the missing logic in the `if` blocks provided below:

```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>
#include <time.h>

int main() {
    int arr[30];
    int status;
    pid_t p1, p2;
    int final_sum_p1 = 0, final_sum_p2 = 0;

    srand(time(NULL));
    printf("Array initialized by Parent \n");
    for (int i = 0; i < 30; i++) arr[i] = rand() % 50 + 1;

    // Child 1
    p1 = fork();
    if () {
     /* .......
         .......
         ....... */
```

```c
    }

    // PARENT WAITS FOR CHILD 1
    waitpid(p1, &status, 0);
    final_sum_p1 = WEXITSTATUS(status);

    // Child 2
    p2 = fork();
    if () {
    /*   .......
         .......
         ....... */
    }

    // Parent waits for Child 2
    waitpid(p2, &status, 0);
    final_sum_p2 = WEXITSTATUS(status);

    printf("\nTotal Even Sum of left side and right side are: %d and %d\n",
        final_sum_p1, final_sum_p2);

    return 0;
}
```