

Assignment8

Team18

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1. Your program functions successfully and correctly as the requirements mentioned above.

```
~/Desktop/碩一上/進階 UNIX 程式設計/Advanced-UNIX-Programming_team18/assignment8 P main 1 0 ./assignment8
Child incrementing, value: 1
Parent incrementing, value: 2
Child incrementing, value: 3
Parent incrementing, value: 4
Child incrementing, value: 5
Parent incrementing, value: 6
Child incrementing, value: 7
Parent incrementing, value: 8
Child incrementing, value: 9
Parent incrementing, value: 10
Child incrementing, value: 11
Parent incrementing, value: 12
Child incrementing, value: 13
Parent incrementing, value: 14
Child incrementing, value: 15
Parent incrementing, value: 16
Child incrementing, value: 17
Parent incrementing, value: 18
Child incrementing, value: 19
Parent incrementing, value: 20
Child incrementing, value: 21
Parent incrementing, value: 22
Child incrementing, value: 23
Parent incrementing, value: 24
Child incrementing, value: 25
Parent incrementing, value: 26
Child incrementing, value: 27
Parent incrementing, value: 28
Child incrementing, value: 29
Parent incrementing, value: 30
Child incrementing, value: 31
Parent incrementing, value: 32
Child incrementing, value: 33
Parent incrementing, value: 34
```

...

```
Child incrementing, value: 67
Parent incrementing, value: 68
Child incrementing, value: 69
Parent incrementing, value: 70
Child incrementing, value: 71
Parent incrementing, value: 72
Child incrementing, value: 73
Parent incrementing, value: 74
Child incrementing, value: 75
Parent incrementing, value: 76
Child incrementing, value: 77
Parent incrementing, value: 78
Child incrementing, value: 79
Parent incrementing, value: 80
Child incrementing, value: 81
Parent incrementing, value: 82
Child incrementing, value: 83
Parent incrementing, value: 84
Child incrementing, value: 85
Parent incrementing, value: 86
Child incrementing, value: 87
Parent incrementing, value: 88
Child incrementing, value: 89
Parent incrementing, value: 90
Child incrementing, value: 91
Parent incrementing, value: 92
Child incrementing, value: 93
Parent incrementing, value: 94
Child incrementing, value: 95
Parent incrementing, value: 96
Child incrementing, value: 97
Parent incrementing, value: 98
Child incrementing, value: 99
Parent incrementing, value: 100
```

2. Describe your implementation in your report.

```
static int increment_counter(FILE *const file) { /* TODO */
    fseek(file, 0, SEEK_SET);
    if (fgets(buf, sizeof(buf), file) != NULL) {
        int value = atoi(buf);
        value++;
        sprintf(buf, "%d", value);
        fseek(file, 0, SEEK_SET);
        fputs(buf, file);
        fflush(file);
        return value;
    } else {
        perror("Error reading from file");
        return -1;
    }
}
```

For increment_counter:

1. 將文件指針移動到文件的開始位置
2. 讀取文件中的數字
3. 字符串轉換為整數再加 1
4. 更新後的數字格式化為字符串
5. 再將數字寫回文件
6. 返回當前 value

```

int main(void) { /* TODO */
    FILE *file = fopen("./sample.txt", "w+");
    fputs("0\n", file);
    fflush(file);
    if (file == NULL) {
        perror("open error");
        exit(1);
    }
    TELL_WAIT();
    pid_t pid;
    if ((pid = fork()) < 0) {
        perror("fork error");
        exit(1);
    } else if (pid == 0) {
        for (int i = 0; i < 50; i++) {
            printf("Child incrementing, value: %d\n", increment_counter(file));
            TELL_PARENT();
            WAIT_PARENT();
        }
        exit(0);
    } else {
        for (int i = 0; i < 50; i++) {
            WAIT_CHILD();
            printf("Parent incrementing, value: %d\n", increment_counter(file));
            TELL_CHILD(pid);
        }
    }

    fclose(file);
    return 0;
}

```

For main function:

1. 開啟 sample.txt 文件 for 讀寫
2. 將初始化數字 0 寫入文件
3. 強制沖洗緩衝流
3. TELL_WAIT() 初始化信號處理
4. fork 創建子進程
5. pid == 0 代表子進程要做的事
6. pid > 0 代表父進程要做的事

7. 父子進程透過 50 次迴圈同步輪流執行 `increment_counter()` 增加文件中的數字並打印結果
8. 子進程透過 `TELL_PARENT()` 發送 `SIGUSR2` 訊號通知父進程，父進程透過 `WAIT_CHILD()` 等待 `SIGUSR2` 信號
9. 父進程透過 `TELL_CHILD(pid)` 發送 `SIGUSR1` 訊號通知子進程，子進程透過 `WAIT_PARENT()`; 等待 `SIGUSR1` 信號
10. 關閉文件流