National University of Computer and Emerging Sciences

Lab Manual 03
Operating Systems

Topic: System Calls

Department of Computer Science
FAST-NU, Lahore, Pakistan

Task 1

- Write C program that asks the user for input between 1 to 10 via command line arguments.
- Then it creates that many processes such that each process is a parent of exactly one process, except one (last one).
- The last process is not the parent of any process.
- Each child process should print its own and parent's ID.

Task 2: Develop a program that reads a large text file (data.txt) containing numeric data separated by spaces across multiple lines.

The program should perform three different analyses on the file:

1. Calculating the total sum
2. Finding the average of all numbers
3. Identifying the maximum and minimum values.

Ensure that all the analyses are performed efficiently and simultaneously, and the results are aggregated and printed at the end.
Hint: Use 3 processes to perform the 3 tasks listed above.

Task 3: Create a program that processes a few text files to analyze word usage.

The program should:

1. Count the frequency of each word in the text.
2. Identify the top 10 most frequently occurring words.
3. Print the results in descending order of frequency.

Hint: Process the text files simultaneously. Take text file names through command line arguments.

Task 4: Create a program that sorts the contents of a text file (unsorted_numbers.txt) containing a list of integers, one per line.

The program should:

1. Divide the list into two halves and sort each half separately
2. Use execlp() to call an external sorting utility (such as the sort command in Linux) for each half.
3. Merge the two sorted halves back into a single, sorted list.
4. Output the fully sorted list to a new file (sorted_numbers.txt)