

CS220- Operating System-1

Assignment Report

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Objective:

To develop a multithreaded solution to find a list of perfect numbers.

About the Assignment:

Implementation of a C program to find the perfect numbers till N and list them into a single file by making use of threads. Total K threads need to be used where each thread runs of n/k values.

Implementation:

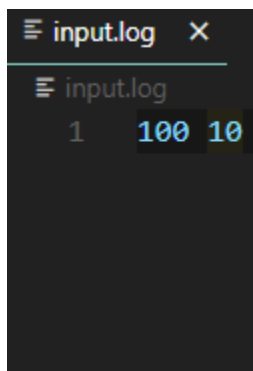
- We created a Boolean function (*isPerfect(int val)*) to check whether a number is perfect or not.
- The values of n and k are read from an *input.log* file available in the folder.
- Also, we declared a global struct node that will store the cycle number and values of n and k.
- Using a for loop, we have created k threads using `pthread_create()` where the *ith* thread has a range of values

lowerLimit and higherLimit to check the perfect number condition.

- We have also used an array to keep track of perfect numbers and thread differentiation. I.e. the array will store the values of numbers that are perfect. When the value of the array at an index is -1, it means that the next values are in new thread.
- The main program calls each thread using `pthread_join(tid, NULL)`.
- The each thread runs using `void*` runner function. Here, every individual result is stored in `OutVal.log` file.
- Each thread ends using `pthread_exit(NULL)`.
- After the end of all threads, the control returns to main function where list of perfect numbers in each thread are stored from main function in `OutMain.log` file using the -1 value condition of array as discussed above.

Sample Run:

Using the values of `n=100` and `k=10`,



```
input.log X
input.log
1 100 10
```

We got following output in files:

EXPLORER

OPEN EDITORS

✕ OutVal.log

Assgn2Src-CS21B1024.c

ASSGN2-CS21B1024

> .vscode

Assgn2Readme-CS21B1024.txt

Assgn2Src-CS21B1024.c

Assgn2Src-CS21B1024.exe

input.log

OutMain.log

OutVal.log

OutVal.log

1 Thread: 1

2 1: Not a perfect number

3 2: Not a perfect number

4 3: Not a perfect number

5 4: Not a perfect number

6 5: Not a perfect number

7 6: Is a perfect number

8 7: Not a perfect number

9 8: Not a perfect number

10 9: Not a perfect number

11 10: Not a perfect number

12 Thread: 2

13 11: Not a perfect number

14 12: Not a perfect number

15 13: Not a perfect number

16 14: Not a perfect number

17 15: Not a perfect number

18 16: Not a perfect number

19 17: Not a perfect number

20 18: Not a perfect number

21 19: Not a perfect number

22 20: Not a perfect number

23 Thread: 3

24 21: Not a perfect number

25 22: Not a perfect number

26 23: Not a perfect number

27 24: Not a perfect number

28 25: Not a perfect number

29 26: Not a perfect number

30 27: Not a perfect number

31 28: Is a perfect number

32 29: Not a perfect number

33 30: Not a perfect number

34 Thread: 4

35 31: Not a perfect number

36 32: Not a perfect number

37 33: Not a perfect number

38 34: Not a perfect number

39 35: Not a perfect number

40 36: Not a perfect number

41 37: Not a perfect number

42 38: Not a perfect number

43 39: Not a perfect number

44 40: Not a perfect number

EXPLORER

OPEN EDITORS

OutVal.log

Assgn2Src-CS21B1024.c

ASSGN2-CS21B1024

.vscode

Assgn2Readme-CS21B1024.txt

Assgn2Src-CS21B1024.c

Assgn2Src-CS21B1024.exe

input.log

OutMain.log

OutVal.log

OutVal.log

45 Thread: 5

46 41: Not a perfect number

47 42: Not a perfect number

48 43: Not a perfect number

49 44: Not a perfect number

50 45: Not a perfect number

51 46: Not a perfect number

52 47: Not a perfect number

53 48: Not a perfect number

54 49: Not a perfect number

55 50: Not a perfect number

56 Thread: 6

57 51: Not a perfect number

58 52: Not a perfect number

59 53: Not a perfect number

60 54: Not a perfect number

61 55: Not a perfect number

62 56: Not a perfect number

63 57: Not a perfect number

64 58: Not a perfect number

65 59: Not a perfect number

66 60: Not a perfect number

67 Thread: 7

68 61: Not a perfect number

69 62: Not a perfect number

70 63: Not a perfect number

71 64: Not a perfect number

72 65: Not a perfect number

73 66: Not a perfect number

74 67: Not a perfect number

75 68: Not a perfect number

76 69: Not a perfect number

77 70: Not a perfect number

78 Thread: 8

79 71: Not a perfect number

80 72: Not a perfect number

81 73: Not a perfect number

82 74: Not a perfect number

83 75: Not a perfect number

84 76: Not a perfect number

85 77: Not a perfect number

86 78: Not a perfect number

87 79: Not a perfect number

88 80: Not a perfect number

-----**Thank You**-----