

# Project Report

## COP5615 - Distributed Operating Systems Principles

The goal is to create an F# application to find the perfect squares that are sums of consecutive squares. Input N and k will be provided as command line to the program. It will find k consecutive numbers starting from 1 to N, such that the sum of the squares is a perfect square.

### Group Members: -

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### Instruction to compile and run the code: -

1. Download the file
2. Open Cmd/terminal and type cd and file path to go to the directory where the project file is downloaded
3. Run the command "dotnet fsi --langversion:preview proj1.fsx 40 24"

### Actors:

There are 8 Actors in the project: 1 Boss and 7 workers.

### Boss and Workers:

The Boss creates 7 workers and supervise them. These workers find the sum of the consecutive numbers which is perfect square for a specific range which is determined by the Boss. We did hit and trial on various different input and determined that the best and optimal number of workers for this job is 7. Therefore, we split the range into 7 parts and asked the workers to determine the squares for that range. Once all the works are done processing, we print the results.

### Result and Runtime

The run time for the program dotnet fsi --langversion:preview proj1.fsx 1000000 4

Output - Real: 00:00:22.642, CPU: 00:01:35.439, GC gen0: 15436, gen1: 4, gen2: 0

TERMINAL	OUTPUT	DEBUG CONSOLE
<pre>Ramandeeps-MacBook-Pro:findsquare ramandeepsingh\$ dotnet fsi --langversion:preview proj1.fsx 1000000 4 Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0 Real: 00:00:22.642, CPU: 00:01:35.439, GC gen0: 15436, gen1: 4, gen2: 0 Ramandeeps-MacBook-Pro:findsquare ramandeepsingh\$</pre>		

## Test Cases and Output

1. dotnet fsi --langversion:preview proj1.fsx 1000000 24

TERMINAL	OUTPUT	DEBUG CONSOLE
<pre>Ramandeeps-MacBook-Pro:findsquare ramandeepsingh\$ dotnet fsi --langversion:preview proj1.fsx 1000000 24 Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0 1 9 20 25 44 76 121 197 304 353 540 856 1301 2053 3112 3597 5448 8576 12981 20425 30908 306060 35709 54032 202289 84996 353585 128601 534964 841476 Real: 00:02:39.252, CPU: 00:11:09.519, GC gen0: 101230, gen1: 18, gen2: 1 Ramandeeps-MacBook-Pro:findsquare ramandeepsingh\$</pre>		

2. dotnet fsi --langversion:preview proj1.fsx 40 24

TERMINAL	OUTPUT	DEBUG CONSOLE
<pre>Ramandeeps-MacBook-Pro:findsquare ramandeepsingh\$ dotnet fsi --langversion:preview proj1.fsx 40 24 Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0 1 9 25 20 Real: 00:00:00.292, CPU: 00:00:00.322, GC gen0: 2, gen1: 1, gen2: 0 Ramandeeps-MacBook-Pro:findsquare ramandeepsingh\$</pre>		

3. dotnet fsi --langversion:preview proj1.fsx 7 2

TERMINAL   OUTPUT   DEBUG CONSOLE

```
Ramandeeps-MacBook-Pro:findsquare ramandeepsingh$ dotnet fsi --langversion:preview proj1.fsx 7 2
Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0
3
Real: 00:00:00.268, CPU: 00:00:00.288, GC gen0: 0, gen1: 0, gen2: 0
Ramandeeps-MacBook-Pro:findsquare ramandeepsingh$
```

## Largest problem that could be solved

TERMINAL   OUTPUT   DEBUG CONSOLE

```
Ramandeeps-MacBook-Pro:findsquare ramandeepsingh$ dotnet fsi --langversion:preview proj1.fsx 10000000 24
Real: 00:00:00.000, CPU: 00:00:00.000, GC gen0: 0, gen1: 0, gen2: 0
1
9
20
25
44
76
121
197
304
353
540
856
1301
2053
3112
3597
5448
8576
12981
20425
30908
35709
54032
84996
128601
202289
3029784
306060
353585
534964
2002557
3500233
841476
5295700
1273121
8329856
Real: 00:35:30.333, CPU: 02:28:18.552, GC gen0: 1293690, gen1: 236, gen2: 21
Ramandeeps-MacBook-Pro:findsquare ramandeepsingh$
```