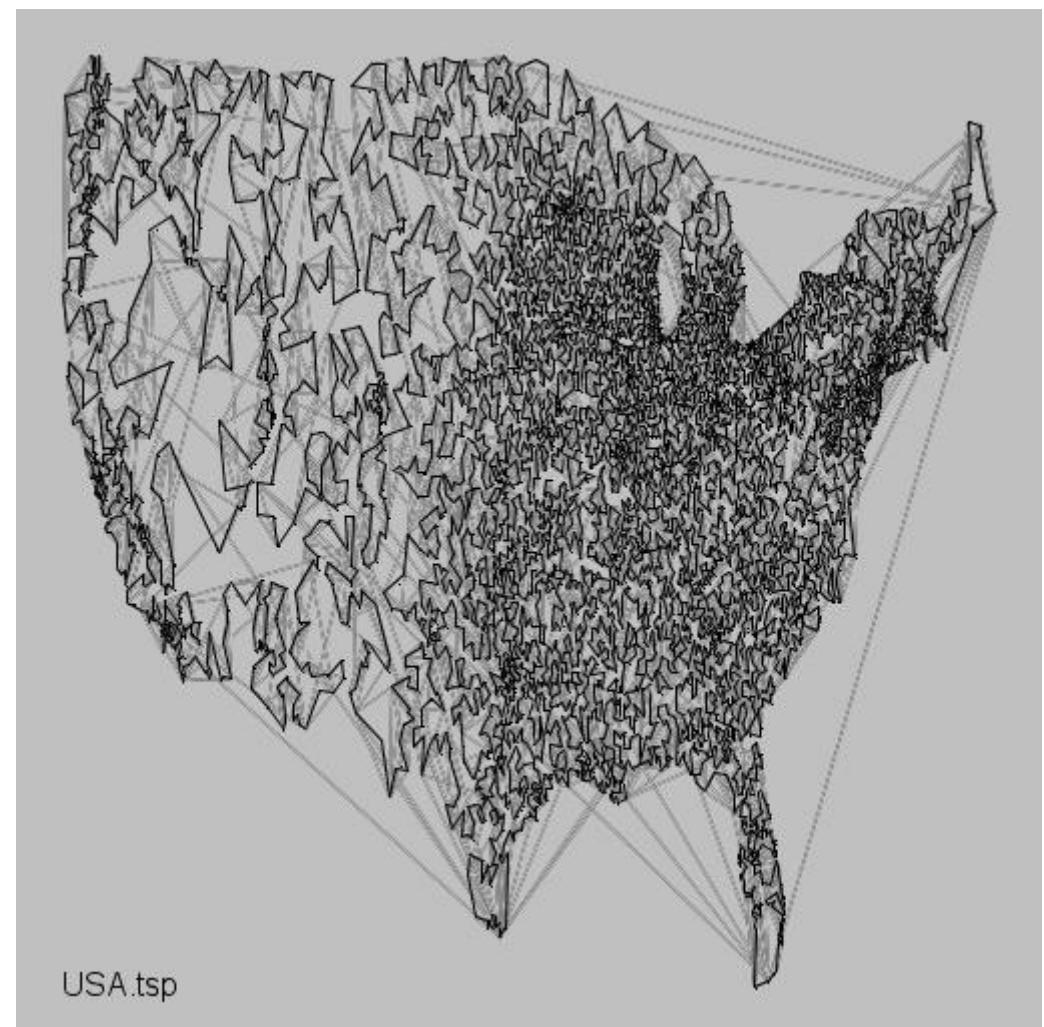


Adam Kurkiewicz



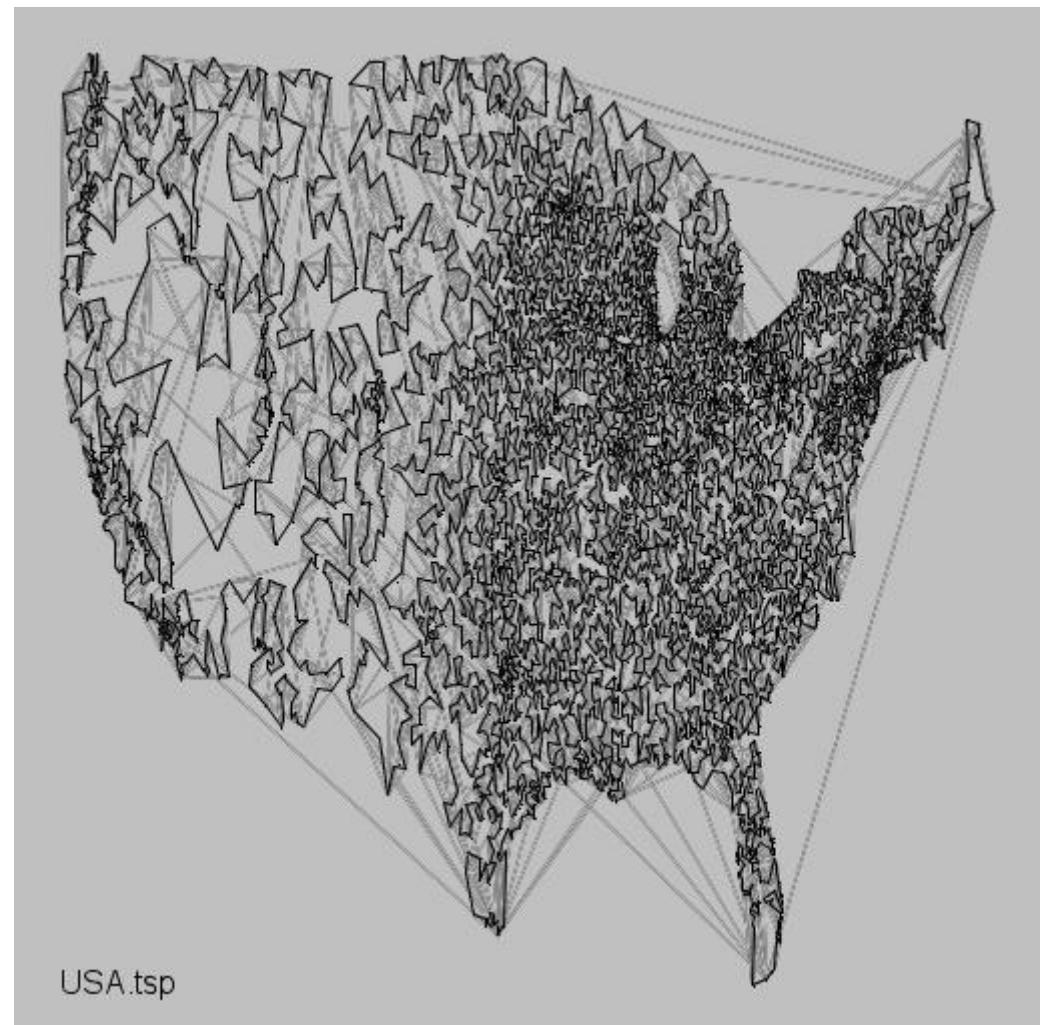
TSP Challenge



TSP Challenge



Impossibly
Difficult
Problems



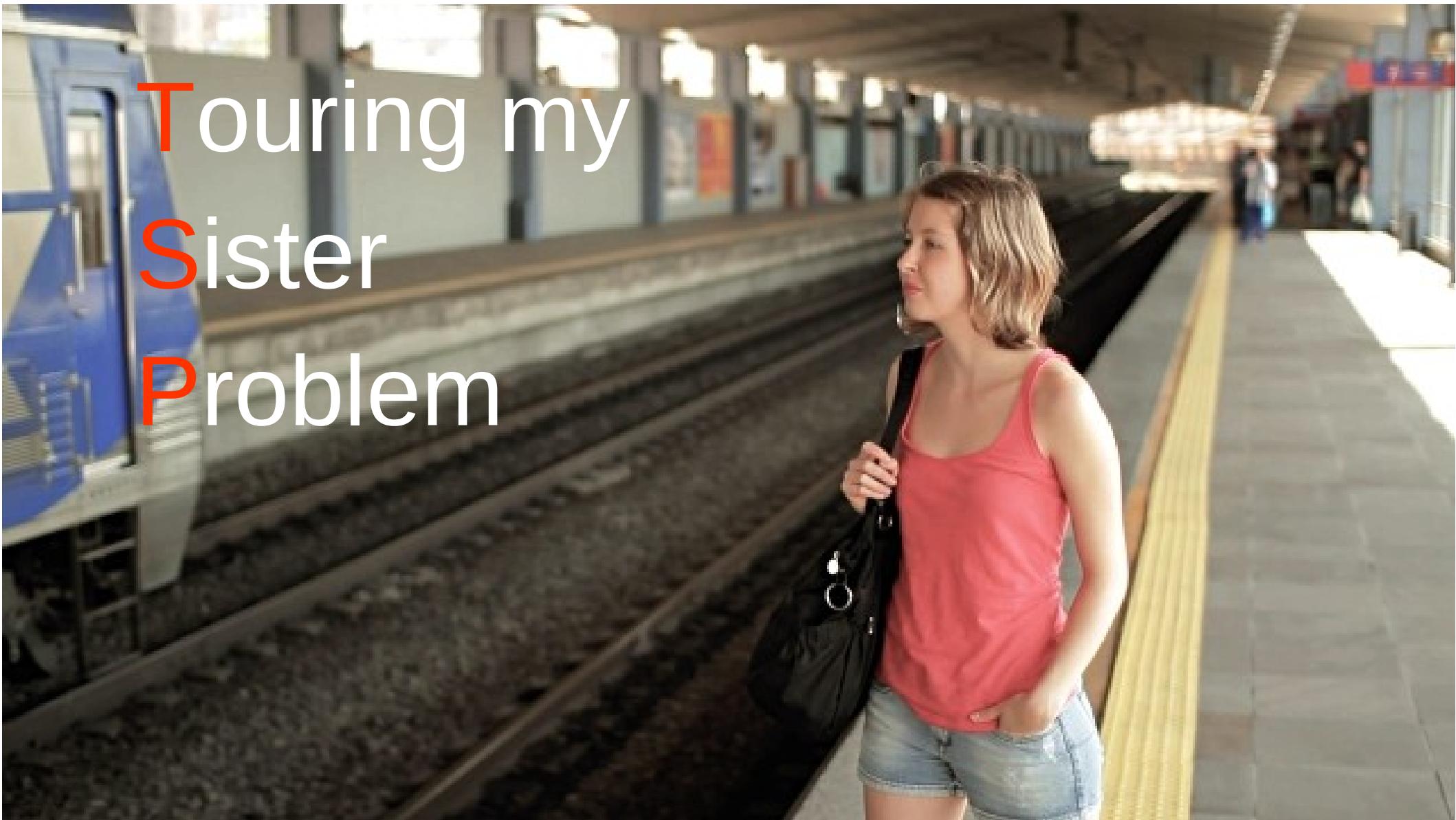
TSP

Travelling Salesman Problem



TSP

Touring my
Sister
Problem













4 5 6 7 8 9 Black Square (painting) - Wikipedia, the free encyclopedia - Google Chrome Fri Oct 02, 16:05

https://en.wikipedia.org/wiki/Black_Square_(painting)

Apps awesome dotfiles POCS exploit piotr gumtree flat search RohdeSup Other bookmarks

Article Talk Read Edit View history Search

Black Square (painting)

From Wikipedia, the free encyclopedia

Kazimir Malevich painted his first Black Square in 1915.^[2] Four variants of the subject were created by Malevich. The last Square is thought to have been painted during the late 1920s or early 1930s, despite the author's "1913" inscription on the reverse.^{[3][4][5]} The painting is commonly known as *Black Square*, *The Black Square* or as *Malevich's Black Square*. It was first shown in *The Last Futurist Exhibition 0.10* in 1915.

The work is frequently invoked by critics, historians, curators, and artists as the "zero point of painting."^{[6][7][8]} This catch-phrase-length shorthand for the painting's historical significance is a paraphrase of a number of comments Malevich made about *Black Square* in letters to his colleagues and dealers.

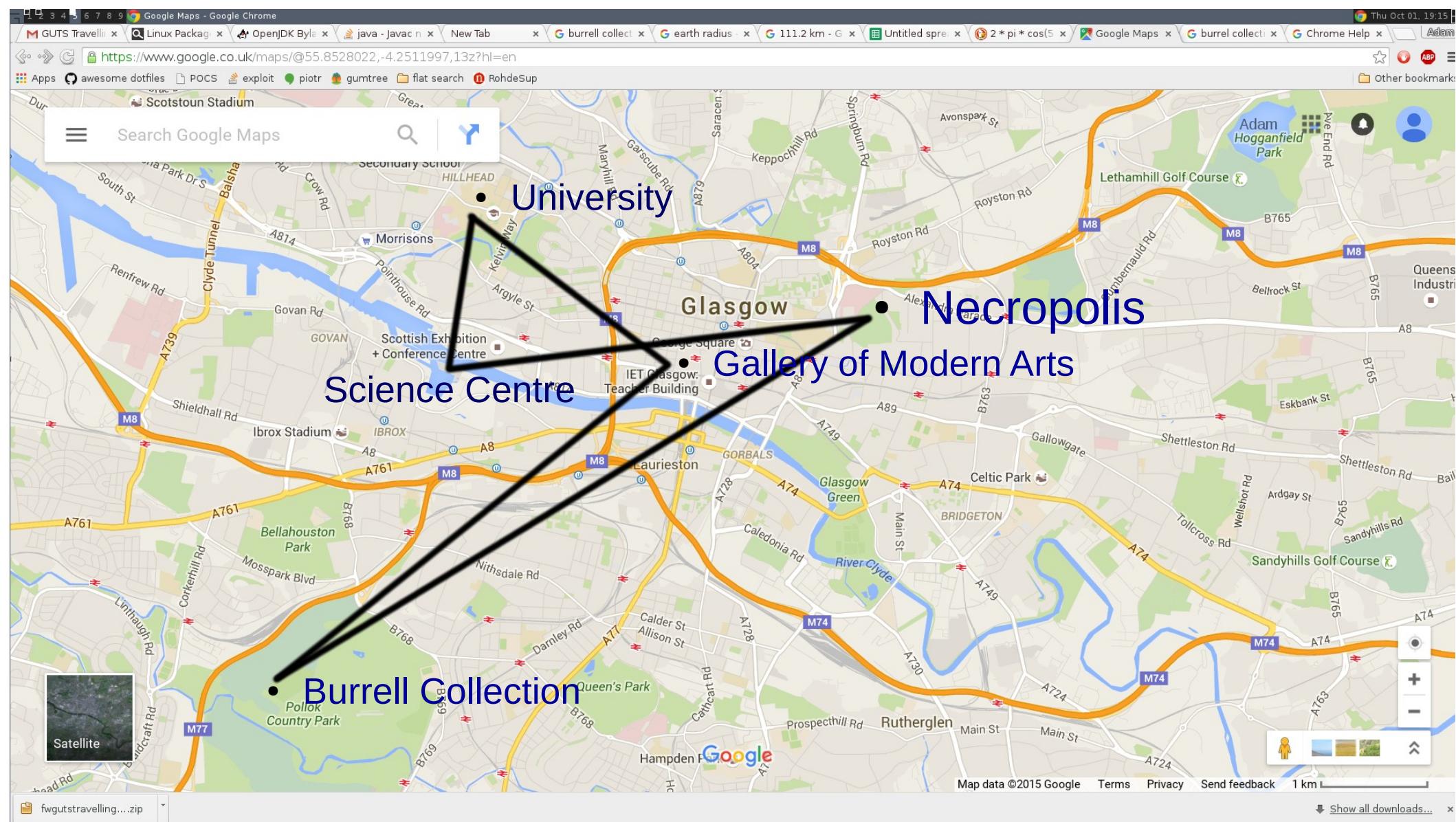
Contents [hide]

1 Malevich on Black Square
2 Historical Context

Black Square, 1915, oil on linen, 79.5 x 79.5 cm, Tretyakov Gallery, Moscow^[1]

Malevich.jpg Show all downloads...

Kazimir Malevich “Black Square”



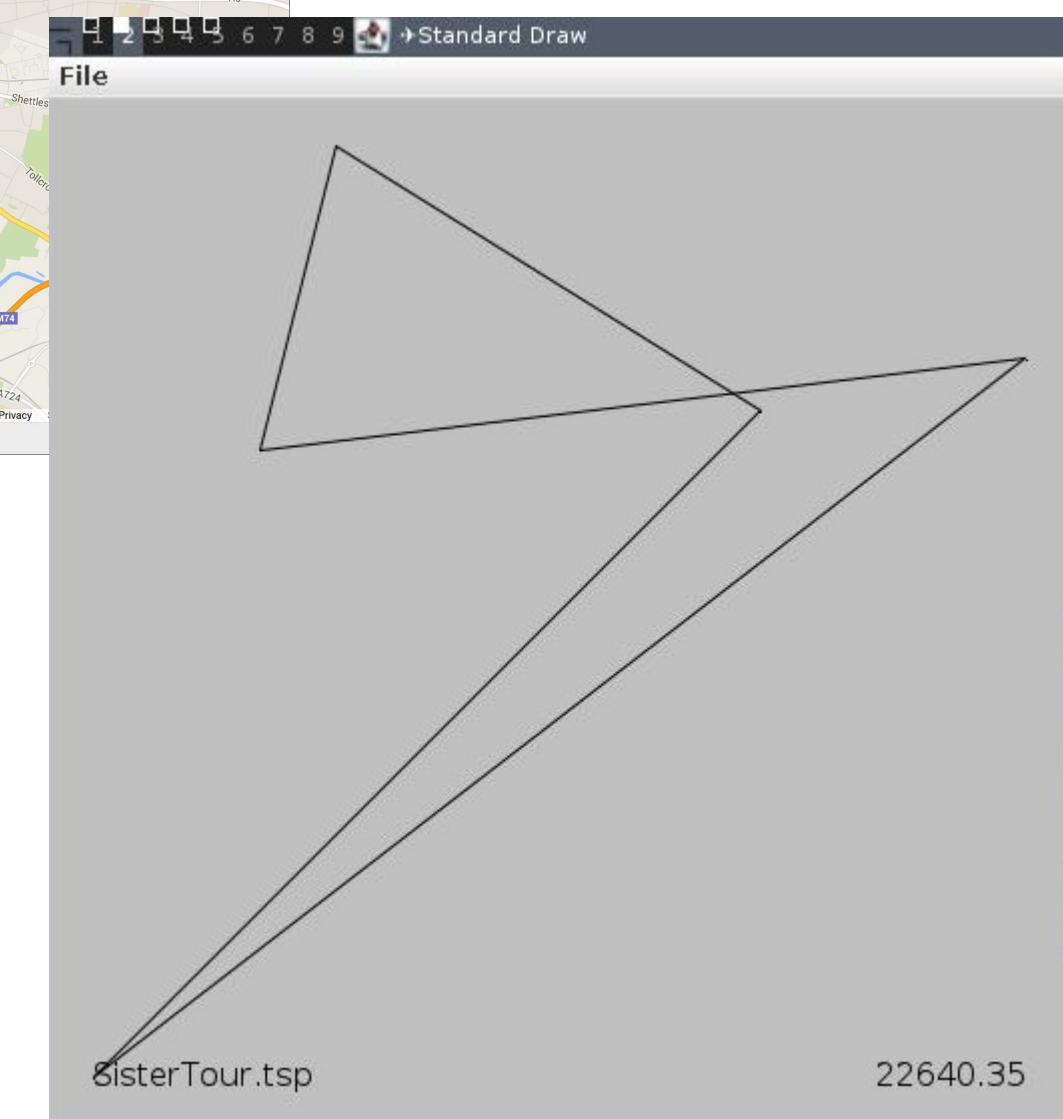
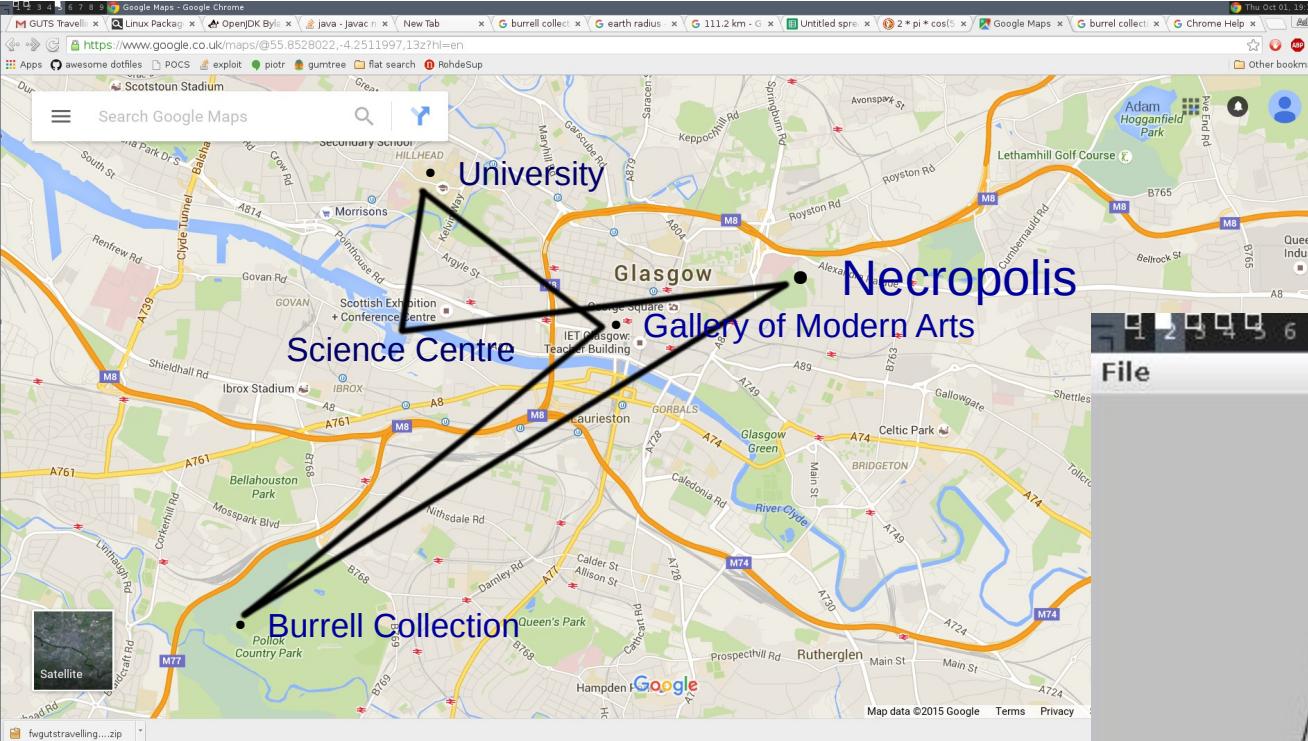
	N°	W°
KELVINGRAVE	55 8686	42° 05'
UNIVERSITY	55 8719	42° 75'
SCIENCE CENTRE	55 8585	42° 38'
NECROPOLIS	55 8625	42° 06'
BUREAU COLLECTION	55 8308	43° 075'
GOMA	55 8602	42° 525'

The diagram illustrates the spatial relationship between five locations in Glasgow. The locations are listed vertically from top to bottom: Glasgow University, Science Centre, Necropolis, Burrell, and GOMA. Lines connect the first four locations to their corresponding labels on the right, while GOMA does not have a visible connection line.

Location	Label
Glasgow University	4570
Science Centre	3080
Necropolis	3525
Burrell	0
GOMA	3269

```
picrin@command:~/Documents/TSP_Challenge/tsp/code/TSP 78x16
0
1
2 The route is an index
3 permutation
4
~
```

"SisterTour.sol" 5L, 10C 1,1 All



java Display SisterTour.tsp SisterTour.sol

Can we do better?

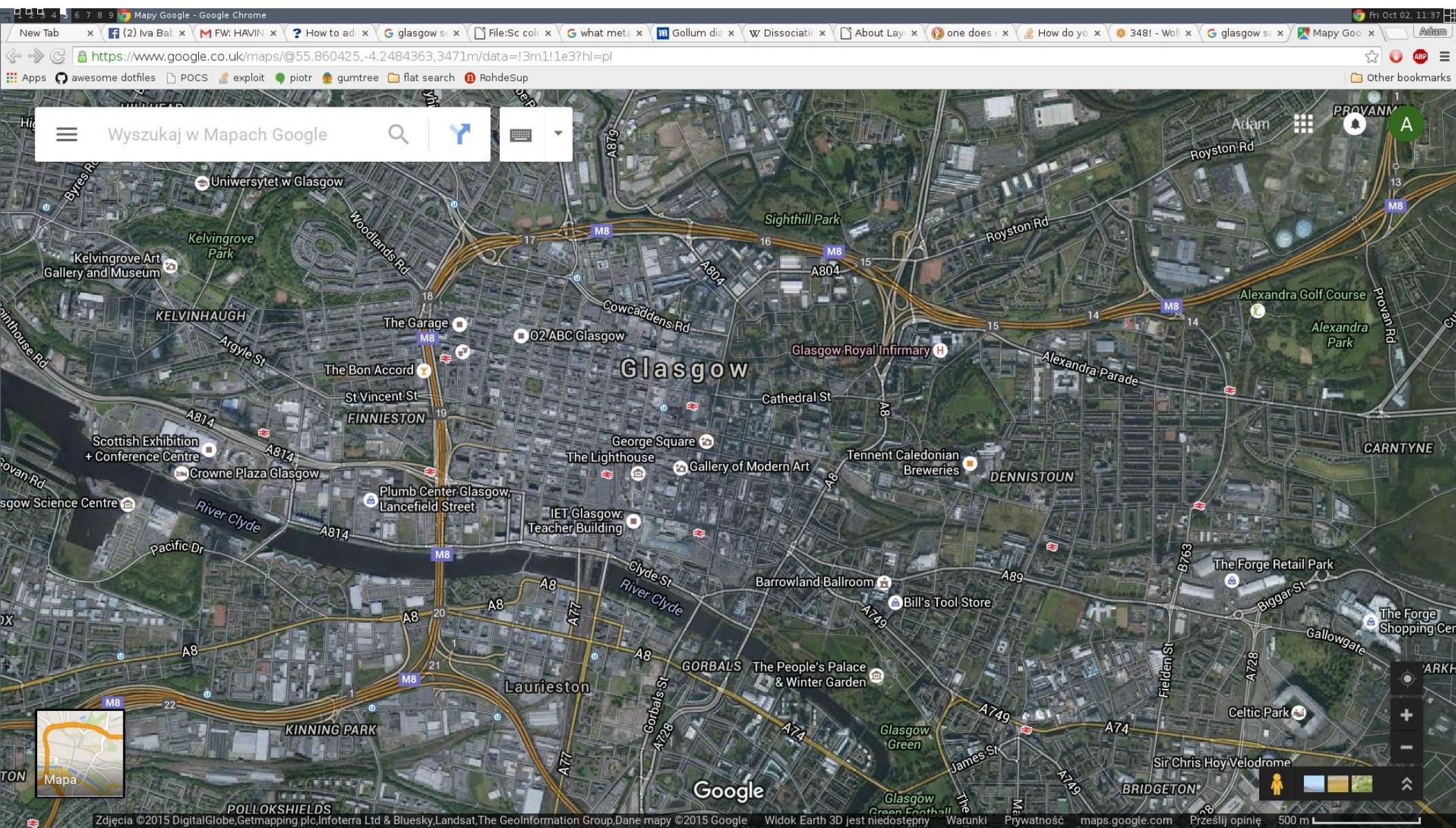
The screenshot shows a terminal window with several tabs open, illustrating the process of solving a Traveling Salesman Problem (TSP) using Java code.

- Tab 1:** Shows a visualization of a tour path on a grid. The path starts at the origin (0,0) and visits several points before returning to the origin. The total tour length is displayed as 16969.53.
- Tab 2:** Displays the tour data in a table format. The columns represent the city index and the city's coordinates. The data is as follows:

City	Coordinates
1632	4570
1118	3080
6275	3525
0	0
4488	3269
- Tab 3:** Shows the command-line output of "SisterTour.sol". It indicates the file has 5 lines and 44 characters.
- Tab 4:** Shows the command-line output of "SisterTour.tsp". It lists the files in the directory: Display.class, StdDraw.class, TSPEException.java, Display.java, StdDraw.java, TSP.java, SisterTour.sol, TSP.class, Verify.class, SisterTour.tsp, TSPEException.class, and Verify.java.
- Tab 5:** Shows the command-line interaction where the user runs "java Display SisterTour.tsp SisterTour.sol" and then quits with "q".

My Sister really liked glasgow

She wants to see all of it

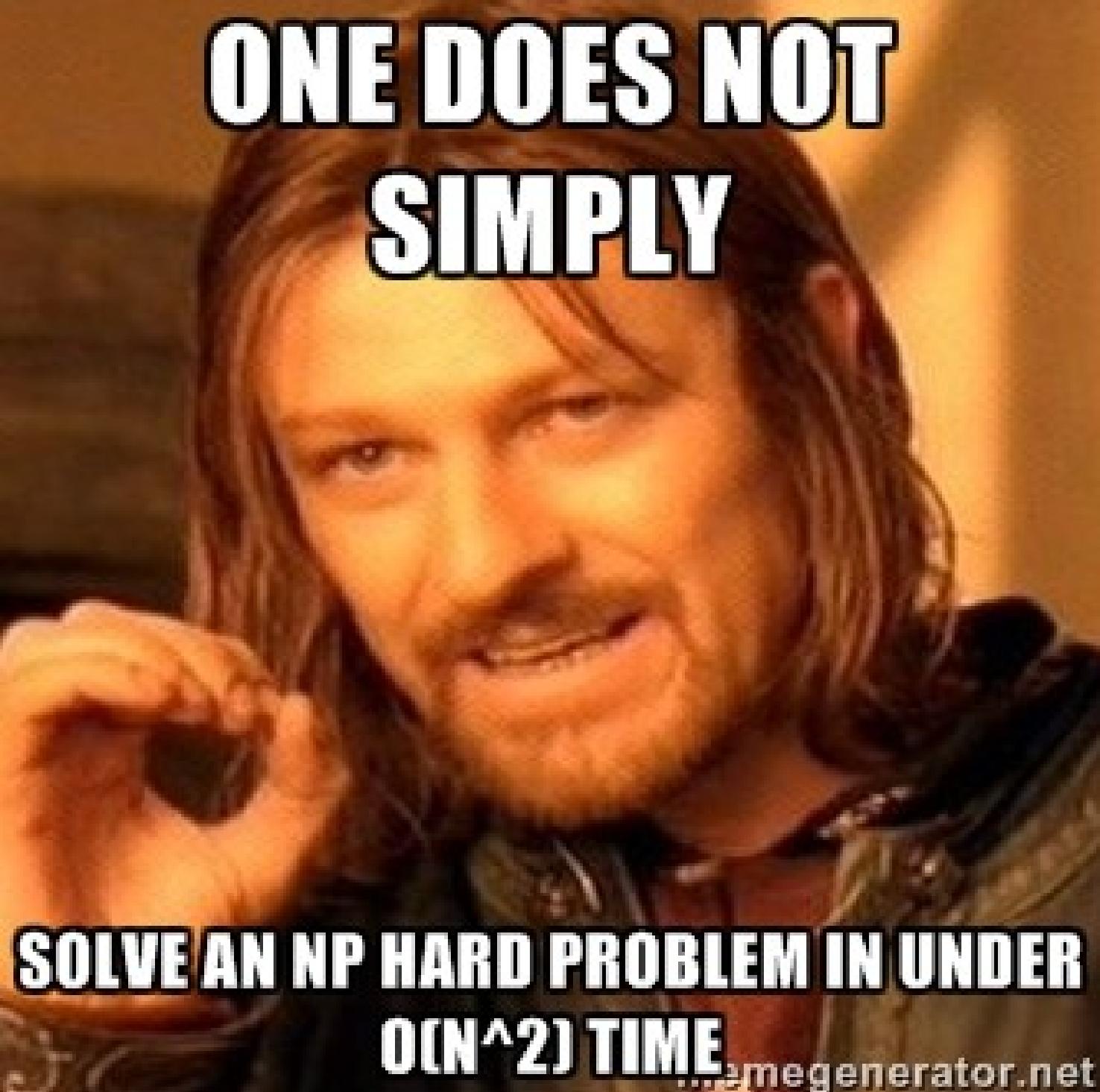


348 postcodes within 7 miles from George Square

```
1 2 3 4 5 6 7 8 9 picrin@command:~/Documents/TSP_Challenge/tsp/code/TSP
picrin@command:~/Documents/TSP_Challenge/tsp/code/TSP 70x18
1 G40 1PE 26003 66456
2 G2 4EW 25853 66584
4 G1 4PU 25866 66505
5 G31 4DS 26232 66430
8 G13 3QN 25335 66885
9 G13 1LU 25469 66866
11 G4 0JB 25911 66621
13 G42 8JL 25864 66262
14 G32 6DW 26258 66490
15 G13 1NE 25468 66859
16 G21 3UT 26143 66791
19 G20 6PU 25752 66775
27 G31 2XG 26105 66507
28 G1 4LZ 25896 66499
44 G20 0EZ 25668 66929
47 G41 4AY 25657 66224
48 G11 7TW 25505 66671
"g7kPostcodes" 348L, 8235C
```

1,1

Top



**ONE DOES NOT
SIMPLY**

**SOLVE AN NP HARD PROBLEM IN UNDER
 $O(N^2)$ TIME**

(348! / (10¹² 1/second)) in years



Examples Random

Input interpretation:

$$\text{convert } \frac{348!}{10^{12} \times \frac{1}{\text{second}}} \text{ to years}$$

$n!$ is the factorial function

Result:

$$3.208 \times 10^{715} \text{ years}$$

Additional conversion:

$$3.208 \times 10^{715} \text{ years}$$

Comparison as age:

$$\approx 2.3 \times 10^{705} \times \text{universe age} (\approx 14 \text{ Gyr})$$

Interpretations:

More

time

age

Download page

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Related Queries:

conversion of units

months vs weeks vs days

physical quantities

Professor Second-like curve

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You don't have to solve it!

- It's enough if you find a better solution than other teams.

You don't have to solve it!

- It's enough if you find a better solution than other teams.
- Extremely well studied problem. You can find a vast body of research describing good approximation algorithms.

You don't have to solve it!

- It's enough if you find a better solution than other teams.
- Extremely well studied problem. You can find a vast body of academic papers that describe good approximation algorithms.
- Pat Prosser will be here on Saturday & Sunday to help you

Detailed instructions on github.com/GUTS2015

The screenshot shows a GitHub repository page for 'GUTS2015 / Glasgow-TSP-Challenge'. The page includes a description section, a commit history for the 'master' branch, and a README.md file containing instructions and sample data.

Description

Short description of this repository

Website

Website for this repository (optional)

Code

- Issues 0
- Pull requests 0
- Wiki
- Pulse
- Graphs
- Settings

Branch: master

Glasgow-TSP-Challenge / +

minor README corrections

picrin authored 11 minutes ago latest commit fc15e17335

code-and-data more data 14 minutes ago

presentation Glasgow TSP challenge 16 minutes ago

README.md minor README corrections 11 minutes ago

README.md

Glasgow TSP Challenge

- Find the shortest tour that covers the 348 locations in file g7k.tsp.
- All locations are space delimited x y coordinates (units might vary), one location per line, e.g.:

```
1632 4570
1118 3080
6275 3525
0 0
```