CSG2341 Intelligent Systems

Workshop 1: A mystery problem

Related Objectives from the Unit outline:

- Describe the concept of computational intelligence and its associated techniques and algorithms

Learning Outcomes:

This workshop poses a problem. You might wonder, when you start, what the point of it is. But if you give it your best try, I think you will benefit from the effort – if not straight away, certainly a little later in the unit.

To give you some extra motivation, there will be a small prize for the team that finds the best solution by the end of the workshop.

Task:

On Blackboard, you will find a Java class file, `Mystery.class`. You can run it by entering a command like:

```
java Mystery 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
23 24
```

The program will run and will print a message:

```
Your solution costs 14.494019436085532
```

Or you could enter:

```
java Mystery 0 1 2 3 4 5 6 7 8 9 15 14 13 12 11 10 16 17 18 19 20 21 22
23 24
```

And the program will answer:

```
Your solution costs 13.559685749654177
```

As the second “solution” costs less than the first, it is better. A “solution” to the mystery problem is a permutation of the integers from 0 to 24, i.e. an arrangement of these numbers in any order.

Your task is to find the cheapest solution to the mystery problem. You can work by yourself or you can form a team. It is up to you how you go about this.

One approach would be to try all possible permutations. How many are there? Well, there are 25x24x23x…x3x2x1 = 25! permutations. This is a VERY large number and you won't have time to check them all, or even more than a tiny fraction. You'll have to think of something better.

Aside from running the `Mystery` class from the command line, you can also try solutions programmatically by writing a Java program. Source for an example program that does this is provided on Blackboard – see `MysteryTester.java`.

Good luck!