**MC2 Data Descriptions**

This data consists of sensor readings from a set of air-sampling sensors and meteorological data from a weather station in proximity to the factories and sensors.

The factories and sensors locations are provided in terms of x,y coordinates on a 200x200 grid, with (0,0) at the lower left hand corner (southwest). The sensors map shows the locations of the sensors and factories by number for the sensors and by name for the factories. Some of the other features of the map (such as entrances and gates in that area) have been removed for readability. (Please note that the terms “sensor” and “monitor” are used interchangeably.)

The following are the factory locations:

Roadrunner Fitness Electronics: 89,27

Kasios Office Furniture: 90,21

Radiance ColourTek: 109,26

Indigo Sol Boards: 120,22

The following are the sensor locations:

1: 62,21

2: 66,35

3: 76,41

4: 88,45

5: 103,43

6: 102,22

7: 89,3

8: 74,7

9: 119,42

The Meteorological data represents 3 months of readings in the following format:

|  |  |  |
| --- | --- | --- |
| Date | Wind Direction | Wind Speed (m/s) |
| 4/1/16 0:00 | 190.5 | 4 |
| 4/1/16 3:00 | 203.3 | 5 |
| 4/1/16 6:00 | 201.1 | 5.2 |
| 4/1/16 9:00 | 204.9 | 4.1 |
| 4/1/16 12:00 | 207 | 3.6 |

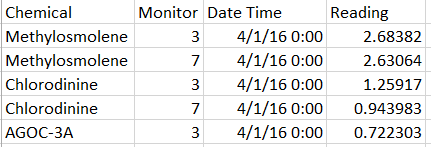
Date: The date and time of the readings, local time with no change for Daylight Savings.

Wind Direction: The compass directions *where the wind is originating from*, using a north-referenced azimuth bearing where 360/000 is true north.

Wind Speed: The speed of the wind in meters per second.

Each of these reading is taken at the date and time provided.

The Sensor data (provided in an Excel spreadsheet) contains 3 months of readings in the following format:



Chemical: Which one of the four chemicals detected by the sensors

Monitor: Which one of the nine sensors picking up the reading

Reading: The air sensor detected amount in parts per million

Date Time: The date and time of day of the reading, local time with no change for Daylight Savings.

**PPM:** For air, the measurement of an element in 1 liter or unit volume. Like mg/m3

So, 1ppm means 1 parts in 100000 parts.

Challenge Questions:

1. Characterize the sensors’ performance and operation. Are they all working properly at all times? Can you detect any unexpected behaviors of the sensors through analyzing the readings they capture? Limit your response to no more than 9 images and 1000 words.
2. Now turn your attention to the chemicals themselves. Which chemicals are being detected by the sensor group? What patterns of chemical releases do you see, as being reported in the data? Limit your response to no more than 6 images and 500 words.
3. Which factories are responsible for which chemical releases? Carefully describe how you determined this using all the data you have available. For the factories you identified, describe any observed patterns of operation revealed in the data. Limit your response to no more than 8 images and 1000 words.