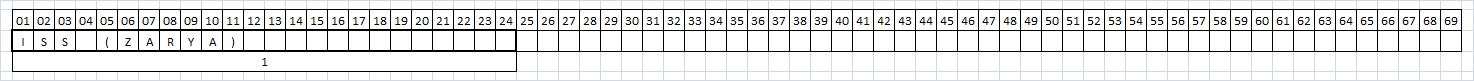
1. **The sources of data that you will extract from.**

https://www.celestrak.com/NORAD/elements/active.txt

<https://www.ucsusa.org/resources/satellite-database#.VT-pISEqGCo>

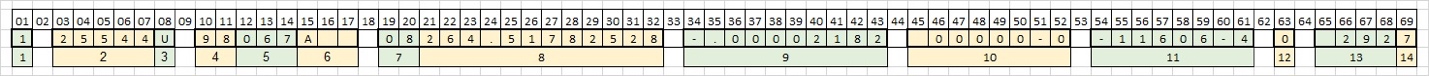
Two-Line Data is formatted as follows:

**Title line**

[](https://en.wikipedia.org/wiki/File:Tle_title.jpg)

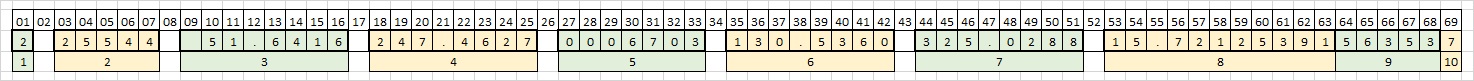
|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Columns** | **Content** | **Example** |
| 1 | 01–24 | Satellite name | ISS (ZARYA) |

**LINE 1**

[](https://en.wikipedia.org/wiki/File:Tle_first_row.jpg)

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Columns** | **Content** | **Example** |
| 1 | 01–01 | Line number | 1 |
| 2 | 03–07 | [Satellite catalog number](https://en.wikipedia.org/wiki/Satellite_Catalog_Number) | 25544 |
| 3 | 08–08 | Classification (U=Unclassified, C=Classified, S=Secret) [[11]](https://en.wikipedia.org/wiki/Two-line_element_set#cite_note-11) | U |
| 4 | 10–11 | [International Designator](https://en.wikipedia.org/wiki/International_Designator) (last two digits of launch year) | 98 |
| 5 | 12–14 | [International Designator](https://en.wikipedia.org/wiki/International_Designator) (launch number of the year) | 067 |
| 6 | 15–17 | [International Designator](https://en.wikipedia.org/wiki/International_Designator) (piece of the launch) | A |
| 7 | 19–20 | [Epoch](https://en.wikipedia.org/wiki/Epoch_(astronomy)) Year (last two digits of year) | 08 |
| 8 | 21–32 | [Epoch](https://en.wikipedia.org/wiki/Epoch_(astronomy)) (day of the year and fractional portion of the day) | 264.51782528 |
| 9 | 34–43 | First Derivative of [Mean Motion](https://en.wikipedia.org/wiki/Mean_Motion) aka the Ballistic Coefficient [[12]](https://en.wikipedia.org/wiki/Two-line_element_set#cite_note-nasahelp-12) | −.00002182 |
| 10 | 45–52 | Second Derivative of [Mean Motion](https://en.wikipedia.org/wiki/Mean_Motion) (decimal point assumed) [[12]](https://en.wikipedia.org/wiki/Two-line_element_set#cite_note-nasahelp-12) | 00000-0 |
| 11 | 54–61 | Drag Term aka Radiation Pressure Coefficient or [BSTAR](https://en.wikipedia.org/wiki/BSTAR) (decimal point assumed) [[12]](https://en.wikipedia.org/wiki/Two-line_element_set#cite_note-nasahelp-12) | -11606-4 |
| 12 | 63–63 | Ephemeris type (internal use only - always zero in distributed TLE data) [[13]](https://en.wikipedia.org/wiki/Two-line_element_set#cite_note-13) | 0 |
| 13 | 65–68 | Element set number. Incremented when a new TLE is generated for this object. [[12]](https://en.wikipedia.org/wiki/Two-line_element_set#cite_note-nasahelp-12) | 292 |
| 14 | 69–69 | [Checksum](https://en.wikipedia.org/wiki/Checksum) ([modulo](https://en.wikipedia.org/wiki/Modulo_operation) 10) | 7 |

**LINE 2**

[](https://en.wikipedia.org/wiki/File:Tle_second_row.jpg)

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Columns** | **Content** | **Example** |
| 1 | 01–01 | Line number | 2 |
| 2 | 03–07 | [Satellite Catalog number](https://en.wikipedia.org/wiki/Satellite_Catalog_Number) | 25544 |
|  | 09–16 | [Inclination](https://en.wikipedia.org/wiki/Orbital_inclination) (degrees) | 51.6416 |
| 4 | 18–25 | [Right Ascension of the Ascending Node](https://en.wikipedia.org/wiki/Right_ascension_of_the_ascending_node) (degrees) | 247.4627 |
| 5 | 27–33 | [Eccentricity](https://en.wikipedia.org/wiki/Orbital_eccentricity) (decimal point assumed) | 0006703 |
| 6 | 35–42 | [Argument of Perigee](https://en.wikipedia.org/wiki/Argument_of_perigee) (degrees) | 130.5360 |
| 7 | 44–51 | [Mean Anomaly](https://en.wikipedia.org/wiki/Mean_Anomaly) (degrees) | 325.0288 |
| 8 | 53–63 | [Mean Motion](https://en.wikipedia.org/wiki/Mean_Motion) (revolutions per day) | 15.72125391 |
| 9 | 64–68 | Revolution number at epoch (revolutions) | 56353 |
| 10 | 69–69 | Checksum (modulo 10) | 7 |

1. **The type of transformation needed for this data. (cleaning, joining, filtering, aggregating, etc).**

The Satellite Catalog Number (also known as NORAD (North American Aerospace Defense) Catalog Number, NORAD ID, NASA catalog number, USSPACECOM object number or simply catalog number and similar variants) is a sequential five-digit number assigned by USSTRATCOM (United States Strategic Command) in order of discovery to all man-made objects in Earth orbit (including rocket bodies and debris) and space probes launched from Earth

https://www.celestrak.com/NORAD/elements/active.txt

The TLE.txt file is cleaned with Orbital.py program file. Orbital.py will perform data transformation by doing the following:

1. Reformats Data Types
2. Reformats the Date
3. Takes a path to the TLE.txt file and returns a list of TLE instances.
4. Takes the name followed by the TLE lines in string form and returns the TLE instance with params determined by TLE lines

The **UCS Satellite Database** is a listing of operational **satellites** currently in orbit around Earth. It is available as a downloadable Excel file, which is updated roughly quarterly

<https://www.ucsusa.org/resources/satellite-database#.VT-pISEqGCo>

This Data contains the NORAD ID which we can use as a foreign key.

1. **The type of final production database to load the data into (relational or non-relational).**

The final load into the database should be RELATIONAL.

PostGreSQL database using pgAdmin as the client.

1. **The final tables or collections that will be used in the production database**

A screenshot of a cell phone

Description automatically generated