NORAD Two-Line Element Sets Current Data

Current as of 2021 Sep 27 14:06:11 UTC (Day 270)

System Notices
Future Availability of TLE Data
Last Updated 2007 May 16

Supplemental TLE Data

Space Track TLE Retriever 3

Space Track Data Access

Special-Interest Satellites
Last 30 Days' Launches
Space Stations
100 (or so) Brightest
Active Satellites
Analyst Satellites
Indian ASAT Test Debris
FENGYUN 1C Debris
IRIDIUM 33 Debris
COSMOS 2251 Debris
Weather & Earth Resources Satellites
Weather

```
NOAA 15
1 25338U 98030A   21270.17379925  .00000042  00000-0  36217-4 0  9995
2 25338  98.6758 297.7562 0010074 350.8865   9.2131 14.26059869215746
DMSP 5D-3 F15 (USA 147)
1 25991U 99067A   21269.74316162  .00000078  00000-0  62189-4 0  9992
2 25991  99.0275 252.1799 0009491 212.5140 320.7421 14.16470559126430
METEOSAT-8 (MSG-1)
1 27509U 02040B   21270.05882718  .00000137  00000-0  00000+0 0  9990
2 27509   7.5525  51.9669 0001530 174.5941 202.2156  1.00267117 69968
DMSP 5D-3 F16 (USA 172)
1 28054U 03048A   21270.23088059 -.00000006  00000-0  20943-4 0  9990
2 28054  98.9639 255.0436 0007311 350.1223  72.0980 14.13636893925846
NOAA 18
1 28654U 05018A   21270.15698829  .00000090  00000-0  72887-4 0  9994
2 28654  98.9844 335.3805 0014049 359.4333   0.6821 14.12641214842898
METEOSAT-9 (MSG-2)
1 28912U 05049B   21269.76408726  .00000017  00000-0  00000-0 0  9998
2 28912   5.4281  67.8600 0000693  50.4350 165.8551  1.00273061 57740
FORMOSAT-3 FM6
1 29047U 06011A   21269.62261909  .00000159  00000-0  78518-4 0  9993
2 29047  71.9770 238.4324 0051383 335.5709  24.2993 14.28838561807878
FORMOSAT-3 FM1
1 29048U 06011B   21269.37274196  .00000116  00000-0  62079-4 0  9996
2 29048  71.9661 149.3150 0045364 296.3456  63.3025 14.28804075810316
FORMOSAT-3 FM5
1 29049U 06011C   21269.55848259  .00000114  00000-0  61222-4 0  9991
2 29049  72.0211 323.2367 0036539 317.0672  42.7614 14.28886127806136
FORMOSAT-3 FM3
1 29050U 06011D   21269.71395948  .00000411  00000-0  96238-4 0  9998
2 29050  72.0158  61.2850 0050272 199.2892 160.6360 14.59120566824318
FORMOSAT-3 FM4
1 29051U 06011E   21269.61743064  .00000107  00000-0  57300-4 0  9993
2 29051  72.0044 224.2608 0068901 200.3741 159.4646 14.28917635808727
FORMOSAT-3 FM2
1 29052U 06011F   21269.51256450  .00000130  00000-0  67021-4 0  9998
2 29052  72.0332 300.0773 0042376 277.4134  82.2189 14.29027693806206
EWS-G1 (GOES 13)
1 29155U 06018A   21269.84755498  .00000033  00000-0  00000-0 0  9993
2 29155   0.1295 118.6977 0007364  92.1343 161.8995  1.00275836 26089
METOP-A
```

```
NOAA 15
1 25338U 98030A   21270.17379925  .00000042  00000-0  36217-4 0  9995
2 25338  98.6758 297.7562 0010074 350.8865   9.2131 14.26059869215746
DMSP 5D-3 F15 (USA 147)
1 25991U 99067A   21269.74316162  .00000078  00000-0  62189-4 0  9992
2 25991  99.0275 252.1799 0009491 212.5140 320.7421 14.16470559126430
METEOSAT-8 (MSG-1)
1 27509U 02040B   21270.05882718  .00000137  00000-0  00000+0 0  9990
2 27509   7.5525  51.9669 0001530 174.5941 202.2156  1.00267117 69968
DMSP 5D-3 F16 (USA 172)
1 28054U 03048A   21270.23088059 -.00000006  00000-0  20943-4 0  9990
2 28054  98.9639 255.0436 0007311 350.1223  72.0980 14.13636893925846
NOAA 18
1 28654U 05018A   21270.15698829  .00000090  00000-0  72887-4 0  9994
2 28654  98.9844 335.3805 0014049 359.4333   0.6821 14.12641214842898
METEOSAT-9 (MSG-2)
1 28912U 05049B   21269.76408726  .00000017  00000-0  00000-0 0  9998
2 28912   5.4281  67.8600 0000693  50.4350 165.8551  1.00273061 57740
FORMOSAT-3 FM6
1 29047U 06011A   21269.62261909  .00000159  00000-0  78518-4 0  9993
2 29047  71.9770 238.4324 0051383 335.5709  24.2993 14.28838561807878
FORMOSAT-3 FM1
1 29048U 06011B   21269.37274196  .00000116  00000-0  62079-4 0  9996
2 29048  71.9661 149.3150 0045364 296.3456  63.3025 14.28804075810316
FORMOSAT-3 FM5
1 29049U 06011C   21269.55848259  .00000114  00000-0  61222-4 0  9991
2 29049  72.0211 323.2367 0036539 317.0672  42.7614 14.28886127806136
FORMOSAT-3 FM3
1 29050U 06011D   21269.71395948  .00000411  00000-0  96238-4 0  9998
2 29050  72.0158  61.2850 0050272 199.2892 160.6360 14.59120566824318
FORMOSAT-3 FM4
1 29051U 06011E   21269.61743064  .00000107  00000-0  57300-4 0  9993
2 29051  72.0044 224.2608 0068901 200.3741 159.4646 14.28917635808727
FORMOSAT-3 FM2
1 29052U 06011F   21269.51256450  .00000130  00000-0  67021-4 0  9998
2 29052  72.0332 300.0773 0042376 277.4134  82.2189 14.29027693806206
EWS-G1 (GOES 13)
1 29155U 06018A   21269.84755498  .00000033  00000-0  00000-0 0  9993
2 29155   0.1295 118.6977 0007364  92.1343 161.8995  1.00275836 26089
METOP-A
```

1
2
3
4
5
6
7
8
9
10
11
12

Satellite 1

satellite number

Satellite 4

line (index) number

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Hello_1.m

Editor - F:\NJIT\2021_Fall\CS-101\06\Print_Recent_Names_1.m

indexing_loop_1.m | Loop_if_1.m | lab_2_start.m | Sat_02_Solution.m | Print_Recent_Names_1.m

```
1   %=========================================================================================
2   % Print the names of recently launched satellites
3   % Author: W. Rutkowski  9/27/2021
4   %=========================================================================================
5   sat_list = string(splitlines(webread("https://www.celestrak.com/NORAD/elements/tle-new.txt")));
6   for i = 1:3:length(sat_list) - 1
7       fprintf("%s\n", sat_list(i));
8   end
```

Command Window

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```
>> Print_Recent_Names_1
DRAGON CRS-23
GAOFEN 5-02
CZ-4C R/B
2021-079C
CHINASAT 9B
CZ-3B R/B
COSMOS 2551
SL-4 R/B
FALCON 9 R/B
STARLINK-3096
STARLINK-3090
STARLINK-3077
STARLINK-3078
STARLINK-3073
STARLINK-3084
STARLINK-3055
STARLINK-3058
STARLINK-3057
STARLINK-3118
STARLINK-3093
STARLINK-3042
STARLINK-3109
STARLINK-3100
STARLINK-3119
STARLINK-3116
```

Workspace

Name	Value
i	304
name	"INSPIRATION4
sat_list	*307x1 string*

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indexing_loop_1.m | Loop_if_1.m | lab_2_start.m | Sat_02_Solution.m | Print_Recent_Names_1.m | Print_Recent_Names_2.m

```
1   %=========================================================================================
2   % Print the names of recently launched satellites
3   % Author: W. Rutkowski  9/27/2021
4   %=========================================================================================
5   sat_list = string(splitlines(webread("https://www.celestrak.com/NORAD/elements/tle-new.txt")));
6   for i = 1:3:length(sat_list) - 1
7       name = sat_list(i);
8       fprintf("%s\n", name);
9   end
```

Command Window

New to MATLAB? See resources for Getting Started.

```
>> Print_Recent_Names_2
DRAGON CRS-23
GAOFEN 5-02
CZ-4C R/B
2021-079C
CHINASAT 9B
CZ-3B R/B
COSMOS 2551
SL-4 R/B
FALCON 9 R/B
STARLINK-3096
STARLINK-3090
STARLINK-3077
STARLINK-3078
STARLINK-3073
STARLINK-3084
STARLINK-3055
STARLINK-3058
STARLINK-3057
STARLINK-3118
STARLINK-3093
STARLINK-3042
STARLINK-3109
STARLINK-3100
STARLINK-3119
```

Workspace

Name	Value
i	304
name	"INSPIRATION4
sat_list	*307x1 string*

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Editor - F:\Code\MATLAB\Sat_Finder_Geo_001.m

Command Window

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```
>> sat_list(4)

ans =

  1×1 cell array

    {'RADCUBE                '}

>> sat_list = string(splitlines(webread("https://celestrak.com/NORAD/elements/tle-new.txt")))

sat_list =

  166×1 string array

    "BRO-4                   "
    "1 49066U 21073A   21254.50874328  .00001124  00000-0  76122-4 0  9999"
    "2 49066  97.5563 327.8488 0030384 156.9144 318.0387 15.08153461  3827"
    "RADCUBE                 "
    "1 49067U 21073B   21254.52674641  .00000984  00000-0  68967-4 0  9999"
    "2 49067  97.5578 327.8305 0028869 164.7838 319.9341 15.07195289  3805"
    "SUNSTORM                "
    "1 49068U 21073C   21254.43793427  .00001840  00000-0  12539-3 0  9999"
    "2 49068  97.5570 327.7422 0028697 165.7955 194.4086 15.07169316  3799"
    "LEDSAT                  "
    "1 49069U 21073D   21254.43860308  .00001139  00000-0  79374-4 0  9995"
    "2 49069  97.5569 327.7412 0028567 165.7630 194.4409 15.07115183  3795"
    "PLEIADES NEO 4          "
    "1 49070U 21073E   21254.44794123 -.00000190  00000-0 -17488-4 0  9995"
    "2 49070  97.8960 328.1776 0001492  91.8426 268.3005 14.81671138  3750"
    "TIANHUI 2-02A           "
    "1 49071U 21074A   21254.53323932  .00000504  00000-0  29062-4 0  9991"
    "2 49071  97.4518 258.1831 0001839 101.7555  11.9168 15.16762934  3586"
    "TIANHUI 2-02B           "
    "1 49072U 21074B   21253.55086127  .00000108  00000-0  88289-5 0  9992"
    "2 49072  97.4516 257.2150 0001740  74.6379  78.2700 15.16757229  3424"
```

Workspace

Name	Value
ans	*1x1 cell*
cat_num	49127
eccentricity	9.8830e-04
i	13900
inclination	96.3440
line_1	"1 49127U 21082A 2...
line_2	"2 49127 96.3440 342....
mean_motion	15.9063
name	"COSMOS 2551 ...
sat_list	*166x1 string*

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```
    "COSMOS 2551              "
    "1 49127U 21082A   21254.48590542  .00130130  77537-5  42187-3 0  9994"
    "2 49127  96.3448 343.2593 0009624 276.8601 222.5512 15.90731836   269"
    "SL-4 R/B                 "
    "1 49128U 21081B   21254.20933657  .00075717  37625-5  23943-3 0  9994"
    "2 49128  96.3484 343.0148 0011855 268.9173  91.0746 15.91234736   221"
    ""

>> sat_list(1)

ans =

    "BRO-4                    "

>> sat_list(2)

ans =

    "1 49066U 21073A   21254.50874328  .00001124  00000-0  76122-4 0  9999"

>> sat_list(3)

ans =

    "2 49066  97.5563 327.8488 0030384 156.9144 318.0387 15.08153461  3827"

>> sat_list(4)

ans =

    "RADCUBE                  "

>>
>>
>>
```

Workspace

Name	Value
ans	"RADCUBE "
cat_num	49127
eccentricity	9.8830e-04
i	13900
inclination	96.3440
line_1	"1 49127U 21082A 2...
line_2	"2 49127 96.3440 342....
mean_motion	15.9063
name	"COSMOS 2551 ...
sat_list	*166x1 string*

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```
    "COSMOS 2551                "
    "1 49127U 21082A   21254.48590542  .00130130  77537-5  42187-3 0  9994"
    "2 49127  96.3448 343.2593 0009624 276.8601 222.5512 15.90731836   269"
    "SL-4 R/B                   "
    "1 49128U 21081B   21254.20933657  .00075717  37625-5  23943-3 0  9994"
    "2 49128  96.3484 343.0148 0011855 268.9173  91.0746 15.91234736   221"
    ""
```

Note this empty line at the end.
This means the number of lines is actually
length(sat_list) - 1

```
>> sat_list(1)

ans =

    "BRO-4                      "

>> sat_list(2)

ans =

    "1 49066U 21073A   21254.50874328  .00001124  00000-0  76122-4 0  9999"

>> sat_list(3)

ans =

    "2 49066  97.5563 327.8488 0030384 156.9144 318.0387 15.08153461  3827"

>> sat_list(4)

ans =

    "RADCUBE                    "

>>
>>
>>
```

Workspace

Name	Value
ans	"RADCUBE "
cat_num	49127
eccentricity	9.8830e-04
i	13900
inclination	96.3440
line_1	"1 49127U 21082A 2...
line_2	"2 49127 96.3440 342....
mean_motion	15.9063
name	"COSMOS 2551 ...
sat_list	*166x1 string*

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indexing_loop_1.m | Loop_if_1.m | lab_2_start.m

```
3     % This is an outline for the program. The goal of the program is to read in
4     % data for a collection of satellites, ask the user for a number, and print
5     % the data for the selected satellite. Number 1 will mean the 1st satellite
6     % in the liat, number 2 the 2nd satellite, etc. Because there are 3 lines
7     % of data for each satellite, we need to compute from the number entered by
8     % the user what line the specified satallites data begins on. Example: if
9     % the user asks for satellite 3, we need to compute the line number as 7.
10    % The name of satellite 3 will be on line 7, and the TLE orbital parameters
11    % will be on lines 8 and 9. The orbital parameters we want to print are
12    % obtained by extracting substrings from the TLE data lines and converting
13    % them to numbers.
14
15    % Read the data from the website.
16    sat_list = string(splitlines(webread("https://celestrak.com/NORAD/elements/new.txt")));
17
18    % Each line below is not complete. Fill in the code to complete the line.
19
20    % Ask the user what satellite they want and compute the line the data
21    % for that satellite begins on.
22    % We need to compute the index bercause each satellite takes three lines,
23    sat_num = input( % get the number of the desired satallite
24    sat_name_index = % compute the index from sat_num
25
26    % get the lines with the name and TLE data from the list of data
27    % that was read from the website and stored in sat_list.
28    name = sat_list( % get the name
29    line_1 = % this is on the next line after the name
30    line_2 = % this is on the next line after line_1
31
32    % Get the required data from the strings line_1 and line_2
33    mean_motion = % extract substring and convert to number
34    eccentricity = % extract substring and convert to number
35    cat_num = % extract substring and convert to number
36
37    fprintf( % print the extracted data
38
```

Workspace

Name	Value
i	10
n	9
word	1x10 string

Command Window

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Name

Hello_1.m

Editor - F:\NJIT\2021_Fall\CS-101\05\Loop_if_1.m

indexing_loop_1.m | Loop_if_1.m

```
1   % while loop
2   fprintf("while loop\n")
3   n = 0;
4   while n < 10
5       fprintf("%4d\n", n)
6       n = n + 1;
7   end
8
9   % for loop
10  fprintf("\nfor loop\n")
11  for n = 0:9
12      fprintf("%4d\n", n)
13  end
14
15  word = ["a" "the" "it" "book" "apple" "for" "door" "open" "at" "do"];
16
17  % for loop with index
18  fprintf("\nfor loop on index\n")
19  for i = 1:length(word)
20      fprintf("%4i) %s\n", i, word(i))
21  end
```

Workspace

Name	Value
i	10
n	9
word	1x10 string

Command Window

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```
>> Loop_if_1
while loop
   0
   1
   2
   3
   4
   5
   6
   7
   8
   9
```

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UTF-8 | script | Ln 1 | Col 8

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Current Folder

Name

Hello_1.m

Editor - F:\NJIT\2021_Fall\CS-101\05\Loop_if_1.m

indexing_loop_1.m | Loop_if_1.m

```
1   % while loop
2   fprintf("while loop\n")
3   n = 0;
4   while n < 10
5       fprintf("%4d\n", n)
6       n = n + 1;
7   end
8
9   % for loop
10  fprintf("\nfor loop\n")
11  for n = 0:9
12      fprintf("%4d\n", n)
13  end
14
15  word = ["a" "the" "it" "book" "apple" "for" "door" "open" "at" "do"];
16
17  % for loop with index
18  fprintf("\nfor loop on index\n")
19  for i = 1:length(word)
20      fprintf("%4i) %s\n", i, word(i))
21  end
```

Workspace

Name	Value
i	10
n	9
word	1x10 string

Command Window

New to MATLAB? See resources for Getting Started.

```
for loop
   0
   1
   2
   3
   4
   5
   6
   7
   8
   9
```

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UTF-8 | script | Ln 16 | Col 1

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Current Folder

Name

Hello_1.m

Editor - F:\NJIT\2021_Fall\CS-101\05\Loop_if_1.m

indexing_loop_1.m | Loop_if_1.m

```
1   % while loop
2   fprintf("while loop\n")
3   n = 0;
4   while n < 10
5       fprintf("%4d\n", n)
6       n = n + 1;
7   end
8
9   % for loop
10  fprintf("\nfor loop\n")
11  for n = 0:9
12      fprintf("%4d\n", n)
13  end
14
15  word = ["a" "the" "it" "book" "apple" "for" "door" "open" "at" "do"];
16
17  % for loop with index
18  fprintf("\nfor loop on index\n")
19  for i = 1:length(word)
20      fprintf("%4i) %s\n", i, word(i))
21  end
```

Workspace

Name	Value
i	10
n	9
word	1x10 string

Command Window

New to MATLAB? See resources for Getting Started.

```
for loop on index
   1) a
   2) the
   3) it
   4) book
   5) apple
   6) for
   7) door
   8) open
   9) at
  10) do
```

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indexing_loop_1.m | Loop_if_1.m

```
22
23      % use if to select some words
24 -    fprintf("\nfor loop on index with if\n")
25 -    for i = 1:length(word)
26 -        if strlength(word(i)) < 4
27 -            fprintf("%4i) %s\n", i, word(i))
28 -        end
29 -    end
30
31      % if with else, classify each word
32 -    fprintf("\nfor loop on index with if else\n")
33 -    for i = 1:length(word)
34 -        if strlength(word(i)) < 4
35 -            fprintf("%4i) %6s\tshort\n", i, word(i))
36 -        else
37 -            fprintf("%4i) %6s\tlong\n", i, word(i))
38 -        end
39 -    end
40
41      % factor out common code
42 -    fprintf("\nfor loop on index with if else, version 2\n")
```

Command Window

New to MATLAB? See resources for Getting Started.

```
for loop on index with if
   1) a
   2) the
   3) it
   6) for
   9) at
  10) do

for loop on index with if else
   1)      a    short
   2)    the    short
   3)     it    short
```

Workspace

Name	Value
i	10
n	9
word	1x10 string

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```

Workspace

Name	Value
i	10
n	9
word	*1x10 string*

Command Window

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```
for loop on index with if else
   1)      a    short
   2)    the    short
   3)     it    short
   4)   book    long
   5)  apple    long
   6)    for    short
   7)   door    long
   8)   open    long
   9)     at    short
  10)     do    short

for loop on index with if else, version 2
```

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38 -        end
39 -    end
40
41      % factor out common code
42 -    fprintf("\nfor loop on index with if else, version 2\n")
43 -    for i = 1:length(word)
44 -        fprintf("%4i) %6s\t", i, word(i))
45 -        if strlength(word(i)) < 4
46 -            fprintf("short\n", i, word(i))
47 -        else
48 -            fprintf("long\n", i, word(i))
49 -        end
50 -    end
```

Workspace

Name	Value
i	10
n	9
word	*1x10 string*

Command Window

New to MATLAB? See resources for Getting Started.

```
for loop on index with if else, version 2
   1)      a    short
   2)    the    short
   3)     it    short
   4)   book    long
   5)  apple    long
   6)    for    short
   7)   door    long
   8)   open    long
   9)     at    short
  10)     do    short
fx >>
```

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45 -        if strlength(word(i)) < 4
46 -            fprintf("short\n", i, word(i))
47 -        else
48 -            fprintf("long\n", i, word(i))
49 -        end
50 -    end
51
52      % for loop with index, skip by 3's
53 -    fprintf("\nfor loop on index\n")
54 -    for i = 1:3:length(word)
55 -        fprintf("%4i) %s\n", i, word(i))
56 -    end
```

Workspace

Name	Value
i	10
n	9
word	1x10 string

Command Window

New to MATLAB? See resources for Getting Started.

```
    5)  apple    long
    6)    for    short
    7)   door    long
    8)   open    long
    9)     at    short
   10)     do    short

for loop on index
    1) a
    4) book
    7) door
   10) do
fx >>
```

UTF-8 script Ln 52 Col 35