In [1]:
```
# Ask:
# Build a web application that scrapes various websites for data related to th
e Mission to Mars and displays
# the information in a single HTML page. The following outlines what you need
 to do.
```

In [2]:
```
# !pip install splinter
# !pip install flask_pymongo
# !pip install pymongo
```

In [4]:
```
# import libraries and requirements
import time
import requests
import pymongo
import pandas as pd
from splinter import Browser
from bs4 import BeautifulSoup
from selenium import webdriver
```

Nasa Mars News

In [5]:
```
# Step 1 - Scraping
# Complete your initial scraping using Jupyter Notebook, BeautifulSoup, Panda
s, and Requests/Splinter.
# Create a Jupyter Notebook file called mission_to_mars.ipynb and use this to
 complete all of your scraping and
# analysistasks. The following outlines what you need to scrape.
```

In [6]:
```
executable_path = {'executable_path': 'chromedriver.exe'}
browser = Browser('chrome', **executable_path, headless=False)

# executable_path = {'executable_path': '/usr/bin/chromedriver'}
# browser = Browser('chrome', **executable_path, headless=False)
```

In [7]:
```
mars_data = {}
hemisphere_image_urls = []

news_url = 'https://mars.nasa.gov/news/'
browser.visit(news_url)
time.sleep(1)

html = browser.html
soup = BeautifulSoup(html, "html.parser")
```

In [28]:
```
soup
```

Out[28]:
```
<!DOCTYPE html>
<html lang="en" xmlns="http://www.w3.org/1999/xhtml"><head>
<link href="//ajax.googleapis.com/ajax/libs/jqueryui/1.11.4/themes/smoothnes
s/jquery-ui.css" rel="stylesheet" type="text/css"/>
<title>Valles Marineris Hemisphere Unenhanced | USGS Astrogeology Science Cen
ter</title>
<meta content="Mosaic of the Valles Marineris hemisphere of Mars projected in
to point perspective, a view similar to that which one would…" name="descript
ion"/>
<meta content="USGS,Astrogeology Science Center,Cartography,Geology,Space,Geo
logical Survey,Mapping" name="keywords"/>
<meta content="IE=edge" http-equiv="X-UA-Compatible"/>
<meta content="text/html; charset=utf-8" http-equiv="Content-Type"/>
<meta content="width=device-width, initial-scale=1, maximum-scale=1" name="vi
ewport"/>
<meta content="x61hXXVj7wtfBSNOPnTftajMsZ5yB2W-qRoyr7GtOKM" name="google-site
-verification"/>
<!--<link rel="stylesheet" href="http://fonts.googleapis.com/css?family=Open+
Sans:400italic,400,bold"/>-->
<link href="/css/main.css" media="screen" rel="stylesheet"/>
<link href="/css/print.css" media="print" rel="stylesheet"/>
<!--[if lt IE 9]>
                        <script src="http://html5shiv.googlecode.com/svn/trun
k/html5.js"></script>
                        <script src="/js/respond.min.js"></script>
                        <link rel="stylesheet" type="text/css" href="/css/ie.
css"/>
                        <script>
                          document.createElement('header');
                          document.createElement('nav');
                          document.createElement('section');
                          document.createElement('article');
                          document.createElement('aside');
                          document.createElement('footer');
                          document.createElement('hgroup');
                        </script>
                    <![endif]-->
<link href="/favicon.ico" rel="icon" type="image/x-ico"/>
</head>
<body id="splashy">
<header>
<h1>Astrogeology Science Center</h1>
<a href="http://www.usgs.gov">
<img alt="USGS: Science for a Changing World" class="logo" height="70" src="/
images/usgs_logo_main_2x.png" width="180"/>
</a>
</header>
<div class="wrapper">
<nav>
<a href="#" id="nav-toggle" title="Navigation Menu">Menu</a>
<ul class="dropdown dropdown-horizontal" id="yw0">
<li><a href="/">Home</a></li>
<li><a href="/about">About</a>
<ul>
<li><a href="/about/careers">Careers</a></li>
<li><a href="/contact">Contact</a></li>
<li><a href="/about/events">Events</a></li>
```

```
<li><a href="/site/glossary">Glossary</a></li>
<li><a href="/about/mission">Mission</a></li>
<li><a href="/news">News</a></li>
<li><a href="/people">People</a></li>
<li><a href="/about/using-our-images">Using Our Images</a></li>
<li><a href="/about/visitors">Visitors</a></li>
</ul>
</li>
<li><a href="/facilities">Labs / Facilities</a>
<ul>
<li><a href="/facilities/flynn-creek-crater-sample-collection">Flynn Creek Cr
ater Sample Collection</a></li>
<li><a href="http://www.moon-cal.org">Lunar Calibration Project</a></li>
<li><a href="/facilities/meteor-crater-sample-collection">Meteor Crater Sampl
e Collection</a></li>
<li><a href="/facilities/mrctr">MRCTR GIS Lab</a></li>
<li><a href="/facilities/cartography-and-imaging-sciences-node-of-nasa-planet
ary-data-system">PDS Cartography and Imaging Sciences Node</a></li>
<li><a href="/pds/annex">PDS IMG Annex</a></li>
<li><a href="/facilities/photogrammetry-guest-facility">Photogrammetry Guest
Facility</a></li>
<li><a href="/rpif">Regional Planetary Information Facility (RPIF)</a></li>
</ul>
</li>
<li><a href="/maps">Maps / Products</a>
<ul>
<li><a href="/search">Product Search</a></li>
<li><a href="http://planetarynames.wr.usgs.gov">Gazetteer of Planetary Nomenc
lature</a></li>
<li><a href="http://planetarymapping.wr.usgs.gov">Geologic Mapping Program</a
></li>
<li><a href="http://pilot.wr.usgs.gov">Planetary Image Locator Tool (PILOT)</
a></li>
<li><a href="/search/planetary-index">Planetary Map Index</a></li>
</ul>
</li>
<li><a href="/geology">Missions / Research</a>
<ul>
<li><a href="/geology/mars-dunes">Mars Dunes</a></li>
<li><a href="/geology/mars-ice">Mars Ice</a></li>
<li><a href="/missions">Mission Support</a></li>
<li><a href="/solar-system">Solar System</a></li>
<li><a href="/groups">Working Groups</a></li>
</ul>
</li>
<li><a href="/tools">Tools</a>
<ul>
<li><a href="http://planetarynames.wr.usgs.gov">Gazetteer of Planetary Nomenc
lature</a></li>
<li><a href="http://isis.astrogeology.usgs.gov">Integrated Software for Image
rs and Spectrometers (ISIS)</a></li>
<li><a href="http://astrogeology.usgs.gov/tools/map-a-planet-2">Map a Planet
2</a></li>
<li><a href="http://pilot.wr.usgs.gov">Planetary Image Locator Tool (PILOT)</
a></li>
<li><a href="http://astrocloud.wr.usgs.gov/">Projection on the Web (POW)</a>
</li>
```

```
</ul>
</li>
</ul> <form action="/search/results" class="search" id="search" method="get">
<input title="Search Astropedia" type="submit" value=""/>
<input name="q" placeholder="Search" type="text"/>
<input name="__ncforminfo" type="hidden" value="5zo1i_eGCv1MfaZDvl6LEfDYNA8cj
zyBW7FAf2WdLaNNwW8Po_NuTd7Dz7pyKSML0NW0wuiilG29WvvaYjDE_f8024rjA-a3aeIY76CGt8
c="/></form>
</nav>
<div class="container">
<div class="widget block bar">
<a href="/search" style="float:left">
<img alt="Astropedia" src="/images/astropedia/astropedia-logo-main.png" style
="width:200px;border:none;"/>
<h3>Product Details</h3>
</a>
</div>
<div class="wide-image-wrapper" id="wide-image">
<div class="downloads">
<img class="thumb" src="/cache/images/624683252b31408dabbc5c051b12a777_valles
_marineris_unenhanced.tif_thumb.png"/>
<h3>Download</h3>
<ul>
<li><a href="http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/val
les_marineris_unenhanced.tif/full.jpg" target="_blank">Sample</a> (jpg) 1024p
x wide</li>
<li><a href="http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/val
les_marineris_unenhanced.tif" target="_blank">Original</a> (tif<span class="t
ooltip word-tif" title=""></span>) 24 MB</li>
</ul>
</div>
<img class="wide-image" src="/cache/images/8981a6d7057a7634dc312c0448f462c1_v
alles_marineris_unenhanced.tif_full.jpg"/>
<a class="open-toggle" href="#open" id="wide-image-toggle">Open</a>
</div>
<div class="content">
<section class="block metadata">
<a class="button" href="/search/results?q=hemisphere+enhanced&amp;k1=target&a
mp;v1=Mars">Back</a>
<h2 class="title">Valles Marineris Hemisphere Unenhanced</h2>
<p>Mosaic of the Valles Marineris hemisphere of Mars projected into point per
spective, a view similar to that which one would see from a spacecraft. The d
istance is 2500 kilometers from the surface of the planet, with the scale bei
ng .6km/pixel. The mosaic is composed of 102 Viking Orbiter images of Mars. T
he center of the scene (lat -8, long 78) shows the entire Valles Marineris ca
nyon system, over 2000 kilometers long and up to 8 kilometers deep, extending
form Noctis Labyrinthus, the arcuate system of graben to the west, to the cha
otic terrain to the east. Many huge ancient river channels begin from the cha
otic terrain from north-central canyons and run north. The three Tharsis volc
anoes (dark red spots), each about 25 kilometers high, are visible to the wes
t. South of Valles Marineris is very ancient terrain covered by many impact c
raters.</p>
<dl>
<dt>Mimetype</dt>
<dd><a href="/search/results?m=image/tiff">image/tiff</a></dd>
<dt>Filename</dt><dd><a href="http://astropedia.astrogeology.usgs.gov/downloa
d/Mars/Viking/valles_marineris_unenhanced.tif">valles_marineris_unenhanced.ti
```

f</dd><dt>Originator</dt><dd></dd><dt>Group</dt><dd></dd><dt>Added to Astropedia</dt><dd>29 September 2011</dd><dt>Modified</dt><dd>3 November 2017</dd></dl><h2>General</h2><dl><dt>Geospatial Data Presentation Form</dt><dd>Global Mosaic</dd></dl><h2>Keywords</h2><dl><dt>Target</dt><dd>Mars</dd><dt>Theme</dt><dd>Canyons</dd><dt>Mission</dt><dd>Viking Orbiter</dd></dl><h2>Geospatial Information</h2><dl><dt>Quad Name</dt><dd></dd> </dl>

```
</section>
</div>
<div class="sidebar">
<div class="block">
<h3 class="title">Related Products</h3>
<a class="item" href="/search/map/Mars/Viking/valles_marineris_enhanced">
<img alt="Valles Marineris Hemisphere Enhanced thumbnail" class="thumb description-thumb" src="/cache/images/04085d99ec3713883a9a57f42be9c725_valles_marineris_enhanced.tif_thumb.png"/>
<div class="description">
<h3>Valles Marineris Hemisphere Enhanced</h3>
<p>Mosaic of the Valles Marineris hemisphere of Mars projected into…</p>
</div>
</a>
<a class="item" href="/search/map/Mars/Viking/syrtis_major_unenhanced">
<img alt="Syrtis Major Hemisphere Unenhanced thumbnail" class="thumb description-thumb" src="/cache/images/0039e532ab44f7836f8a384d6f9adc3f_syrtis_major_unenhanced.tif_thumb.png"/>
<div class="description">
<h3>Syrtis Major Hemisphere Unenhanced</h3>
<p>Mosaic of the Syrtis Major hemisphere of Mars projected into point…</p>
</div>
</a>
<a class="item" href="/search/map/Mars/Viking/syrtis_major_enhanced">
<img alt="Syrtis Major Hemisphere Enhanced thumbnail" class="thumb description-thumb" src="/cache/images/aae41197e40d6d4f3ea557f8cfe51d15_syrtis_major_enhanced.tif_thumb.png"/>
<div class="description">
<h3>Syrtis Major Hemisphere Enhanced</h3>
<p>Mosaic of the Syrtis Major hemisphere of Mars projected into point…</p>
</div>
</a>
<a class="item" href="/search/map/Mars/Viking/schiaparelli_unenhanced">
<img alt="Schiaparelli Hemisphere Unenhanced thumbnail" class="thumb description-thumb" src="/cache/images/eeda48b8f032727970d735b2b689937c_schiaparelli_unenhanced.tif_thumb.png"/>
<div class="description">
<h3>Schiaparelli Hemisphere Unenhanced</h3>
<p>Mosaic of the Schiaparelli hemisphere of Mars projected into point…</p>
</div>
</a>
<a class="item" href="/search/map/Mars/Viking/schiaparelli_enhanced">
<img alt="Schiaparelli Hemisphere Enhanced thumbnail" class="thumb description-thumb" src="/cache/images/7677c0a006b83871b5a2f66985ab5857_schiaparelli_enhanced.tif_thumb.png"/>
<div class="description">
<h3>Schiaparelli Hemisphere Enhanced</h3>
```

```
<p>Mosaic of the Schiaparelli hemisphere of Mars projected into point…</p>
</div>
</a>
<ul class="page-numbers"><li><a class="active" href="/search/map/Mars/Viking/
valles_marineris_unenhanced?p=1&amp;pb=1#downloads">1</a></li><li><a class=""
href="/search/map/Mars/Viking/valles_marineris_unenhanced?p=2&amp;pb=1#downlo
ads">2</a></li></ul></div></div>
</div>
<div class="icons projects black scroll-wrapper">
<div class="scroll">
<a class="icon" href="http://isis.astrogeology.usgs.gov" title="Integrated So
ftware for Imagers and Spectrometers">
<img alt="ISIS Logo" height="112" src="/images/logos/isis_2x.jpg" width="11
2"/>
<span class="label">ISIS</span>
</a>
<a class="icon" href="http://planetarynames.wr.usgs.gov" title="Gazetteer of
Planetary Nomenclature">
<img alt="Nomenclature Logo" height="112" src="/images/logos/nomenclature_2x.
jpg" width="112"/>
<span class="label">Planetary Nomenclature</span>
</a>
<a class="icon" href="http://astrogeology.usgs.gov/tools/map" title="Map a Pl
anet 2">
<img alt="Map-a-Planet Logo" height="112" src="/images/logos/map_a_planet_2x.
jpg" width="112"/>
<span class="label">Map a Planet 2</span>
</a>
<a class="icon" href="/facilities/imaging-node-of-nasa-planetary-data-system-
pds" title="PDS Imaging Node">
<img alt="PDS Logo" height="112" src="/images/pds_logo-black-web.png"/>
<span class="label">PDS Imaging Node</span>
</a>
<!--
                                                <a title="Astropedia Search"
href="/search" class="icon">
                                                    <img alt="Astropedia
Logo" height="112" width="112" src="/images/logos/astropedia_2x.jpg"/>
                                                    <span class="label">A
stropedia</span>
                                                </a>
-->
<a class="icon" href="/rpif" title="Regional Planetary Image Facility">
<img alt="RPIF Logo" height="112" src="/images/logos/rpif_2x.jpg" width="11
2"/>
<span class="label">RPIF</span>
</a>
<a class="icon" href="/facilities/photogrammetry-guest-facility" title="Photo
grammetry Guest Facility">
<img alt="Photogrammetry Guest Faciltiy Logo" height="112" src="/images/logo
s/photogrammetry_2x.jpg" width="112"/>
<span class="label">Photogrammetry Guest Facility</span>
</a>
<a class="icon" href="http://pilot.wr.usgs.gov" title="Planetary Image Locato
r Tool">
<img alt="Pilot Logo" height="112" src="/images/logos/pilot_2x.jpg" width="11
2"/>
```

```
<span class="label">PILOT</span>
</a>
<a class="icon" href="/facilities/mrctr" title="Mapping, Remote-sensing, Cart
ography, Technology and Research GIS Lab">
<img alt="MRCTR GIS Lab Logo" height="112" src="/images/logos/mrctr_2x.jpg" w
idth="112"/>
<span class="label">MRCTR GIS Lab</span>
</a>
</div>
</div>
<footer>
<div class="left">
<a href="http://astrogeology.usgs.gov">Home</a> |
                                        <a href="http://astrogeology.usgs.go
v/contact">Contact</a> |
                                        <a href="http://astrogeology.usgs.go
v/about/events">Events</a> |
                                        <a href="http://astrogeology.usgs.go
v/news">News</a>
</div>
<div class="right">
<a href="http://www.doi.gov">U.S. Department of Interior</a> | <a href="htt
p://www.usgs.gov">U.S. Geological Survey</a> | <a href="http://www.usa.gov">U
SA.gov</a>
</div>
</footer>
</div>
<!--
                <div class="credit">
                        <small>Background Credits: NASA/USGS</small>
                </div>
-->
<div class="page-background" style="
                        background:url('/images/backgrounds/mars.jpg');
                        filter:progid:DXImageTransform.Microsoft.AlphaImageLo
ader(
                                src='/images/backgrounds/mars.jpg', sizingMet
hod='scale');
                "></div>
<script async="" src="https://ssl.google-analytics.com/ga.js" type="text/java
script"></script><script type="text/javascript">
var baseUrl = "";


var _gaq = _gaq || [];_gaq.push(['_setAccount', 'UA-27613186-1']);_gaq.push
(['_trackPageview']);(function() { var ga = document.createElement('script');
ga.type = 'text/javascript'; ga.async = true;ga.src = ('https:' == document.l
ocation.protocol ? 'https://ssl' : 'http://www') + '.google-analytics.com/ga.
js'; var s = document.getElementsByTagName('script')[0]; s.parentNode.insertB
efore(ga, s);})();

                </script>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/1.11.1/jquery.min.j
s" type="text/javascript"></script>
<script src="//ajax.googleapis.com/ajax/libs/jqueryui/1.11.4/jquery-ui.min.j
s" type="text/javascript"></script>
<script src="https://astropedia.astrogeology.usgs.gov/downloadWeb/dynamic/glo
```

```
ssary.js" type="text/javascript"></script>
<script src="/js/astro-tips.js" type="text/javascript"></script>
<script src="/js/general.js" type="text/javascript"></script>
<script type="text/javascript">
/*&lt;![CDATA[*/
showTooltips(".downloads, .content dl, .listing", true);
/*]]&gt;*/
</script><div aria-live="assertive" aria-relevant="additions" class="ui-helpe
r-hidden-accessible" role="log"></div><div aria-live="assertive" aria-relevan
t="additions" class="ui-helper-hidden-accessible" role="log"></div>
</body></html>
```

In [9]:
```
# Scrape the NASA Mars News Site and collect the latest News Title and Paragra
ph Text.
# Assign the text to variables that you can reference later.
news_soup = BeautifulSoup(html, 'html.parser')
result = news_soup.find('div', class_='content_title')
news_title = result.next_element.get_text()
result1 = news_soup.find('div', class_='article_teaser_body')
news_p = result1.get_text()

mars_data["news_title"] = news_title
mars_data["news_p"] = news_p
mars_data
```

Out[9]:
```
{'news_title': "Things Are Stacking up for NASA's Mars 2020 Spacecraft",
 'news_p': 'As the July 2020 launch date inches closer, the next spacecraft h
eaded to the Red Planet is assembled for more testing.'}
```

In [10]:
```
# JPL Mars Space Images - Featured Image
# Visit the url for JPL Featured Space Image here.
# Use splinter to navigate the site and find the image url for the current Fea
tured Mars Image
# and assign the url string to a variable called featured_image_url.
# Make sure to find the image url to the full size .jpg image.
# Make sure to save a complete url string for this image.
```

In [11]:
```
image_url = 'https://www.jpl.nasa.gov/spaceimages/?search=&category=Mars'
browser.visit(image_url)
time.sleep(1)

html = browser.html
image_soup = BeautifulSoup(html, "html.parser")
image = image_soup.find('div', class_='carousel_items')
image_url = image.article['style']
url = image_url.split('/s')[-1].split('.')[0]
featured_image_url = 'https://www.jpl.nasa.gov' + '/s' + url + '.jpg'

mars_data["featured_image_url"] = featured_image_url
mars_data
```

Out[11]:
```
{'news_title': "Things Are Stacking up for NASA's Mars 2020 Spacecraft",
 'news_p': 'As the July 2020 launch date inches closer, the next spacecraft h
eaded to the Red Planet is assembled for more testing.',
 'featured_image_url': 'https://www.jpl.nasa.gov/spaceimages/images/wallpape
r/PIA18905-1920x1200.jpg'}
```

In [12]:
```
# Mars Weather
# Visit the Mars Weather twitter account here and scrape the latest Mars weath
er tweet from the page.
# Save the tweet text for the weather report as a variable called mars_weathe
r.
```

In [13]:
```
weather_url = 'https://twitter.com/marswxreport?lang=en'
browser.visit(weather_url)
time.sleep(1)
html = browser.html

weather_soup = BeautifulSoup(html, 'html.parser')
weather = weather_soup.find('div', class_='js-tweet-text-container')

mars_weather = weather.p.text
mars_data["mars_weather"] = mars_weather
mars_data
```

Out[13]:
```
{'news_title': "Things Are Stacking up for NASA's Mars 2020 Spacecraft",
 'news_p': 'As the July 2020 launch date inches closer, the next spacecraft h
eaded to the Red Planet is assembled for more testing.',
 'featured_image_url': 'https://www.jpl.nasa.gov/spaceimages/images/wallpape
r/PIA18905-1920x1200.jpg',
 'mars_weather': 'InSight sol 141 (2019-04-20) low -98.3ºC (-144.9ºF) high -1
9.7ºC (-3.5ºF)\nwinds from the SW at 4.7 m/s (10.6 mph) gusting to 12.9 m/s
(28.8 mph)\npressure at 7.40 hPapic.twitter.com/CQr1QQt3cM'}
```

In [14]:
```
# Mars Facts
# Visit the Mars Facts webpage here (https://space-facts.com/mars/) and use Pa
ndas to scrape the table containing facts about the planet
# including Diameter, Mass, etc.
# Use Pandas to convert the data to a HTML table string.
```

In [15]:
```
facts_url = 'http://space-facts.com/mars/'
tables = pd.read_html(facts_url)
tables
```

Out[15]:
```
[                     0                              1
 0  Equatorial Diameter:                       6,792 km
 1       Polar Diameter:                       6,752 km
 2                 Mass:  6.42 x 10^23 kg (10.7% Earth)
 3                Moons:            2 (Phobos & Deimos)
 4      Orbit Distance:       227,943,824 km (1.52 AU)
 5        Orbit Period:           687 days (1.9 years)
 6  Surface Temperature:                  -153 to 20 °C
 7         First Record:              2nd millennium BC
 8          Recorded By:           Egyptian astronomers]
```

In [16]:
```
df = tables[0]
df.columns = ['Mars_planet_profile', 'Value']
df
```

Out[16]:

	Mars_planet_profile	Value
0	Equatorial Diameter:	6,792 km
1	Polar Diameter:	6,752 km
2	Mass:	6.42 x 10^23 kg (10.7% Earth)
3	Moons:	2 (Phobos & Deimos)
4	Orbit Distance:	227,943,824 km (1.52 AU)
5	Orbit Period:	687 days (1.9 years)
6	Surface Temperature:	-153 to 20 °C
7	First Record:	2nd millennium BC
8	Recorded By:	Egyptian astronomers

In [17]:
```
mars_facts = df.to_dict('records')
Table = []
for i in range(0, len(mars_facts)):
    temp = list(mars_facts[i].values())
    Table.append(temp)
mars_data["mars_facts"] = Table
mars_data
```

Out[17]:
```
{'news_title': "Things Are Stacking up for NASA's Mars 2020 Spacecraft",
 'news_p': 'As the July 2020 launch date inches closer, the next spacecraft h
eaded to the Red Planet is assembled for more testing.',
 'featured_image_url': 'https://www.jpl.nasa.gov/spaceimages/images/wallpape
r/PIA18905-1920x1200.jpg',
 'mars_weather': 'InSight sol 141 (2019-04-20) low -98.3ºC (-144.9ºF) high -1
9.7ºC (-3.5ºF)\nwinds from the SW at 4.7 m/s (10.6 mph) gusting to 12.9 m/s
(28.8 mph)\npressure at 7.40 hPapic.twitter.com/CQr1QQt3cM',
 'mars_facts': [['Equatorial Diameter:', '6,792 km'],
  ['Polar Diameter:', '6,752 km'],
  ['Mass:', '6.42 x 10^23 kg (10.7% Earth)'],
  ['Moons:', '2 (Phobos & Deimos)'],
  ['Orbit Distance:', '227,943,824 km (1.52 AU)'],
  ['Orbit Period:', '687 days (1.9 years)'],
  ['Surface Temperature:', '-153 to 20 °C'],
  ['First Record:', '2nd millennium BC'],
  ['Recorded By:', 'Egyptian astronomers']]}
```

In [18]:
```
# Mars Hemispheres
# Visit the USGS Astrogeology site here to obtain high resolution images for e
ach of Mar's hemispheres.
# You will need to click each of the links to the hemispheres in order to find
the image url to the full
# resolution image.
# Save both the image url string for the full resolution hemisphere image, and
the Hemisphere title containing
# the hemisphere name. Use a Python dictionary to store the data using the key
s img_url and title.
# Append the dictionary with the image url string and the hemisphere title to
 a list. This list will contain
# one dictionary for each hemisphere.
```

In [19]:
```
executable_path = {"executable_path": "chromedriver"}
browser = Browser("chrome", **executable_path, headless=False)

url = "https://astrogeology.usgs.gov/search/results?q=hemisphere+enhanced&k1=t
arget&v1=Mars"
browser.visit(url)

html = browser.html
soup = BeautifulSoup(html, "html.parser")

h3s = soup.find_all("h3")
```

In [20]:
```
titles = []
for h3 in h3s:
    h3 = str(h3)
    h3 = h3[4:-14]
    titles.append(h3)
titles
```

Out[20]:
```
['Cerberus Hemisphere',
 'Schiaparelli Hemisphere',
 'Syrtis Major Hemisphere',
 'Valles Marineris Hemisphere']
```

In [21]:
```
img_urls = []
for title in titles:
    browser.click_link_by_partial_text(title)

    html = browser.html
    soup = BeautifulSoup(html, "html.parser")

    img_urls.append(soup.find("div", class_="downloads").find("a")["href"])
img_urls
```

Out[21]:
```
['http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/cerberus_enhanced.tif/full.jpg',
 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/schiaparelli_unenhanced.tif/full.jpg',
 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/syrtis_major_unenhanced.tif/full.jpg',
 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/valles_marineris_unenhanced.tif/full.jpg']
```

In [22]:
```
# 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/cerberus_enhanced.tif/full.jpg',
#  'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/schiaparelli_enhanced.tif/full.jpg',
#  'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/syrtis_major_enhanced.tif/full.jpg',
#  'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/valles_marineris_enhanced.tif/full.jpg'
```

In [23]:
```
hemisphere_image_urls = []
for title, img_url in zip(titles, img_urls):
    hemisphere_image_urls.append({"title": title, "img_url":img_url})

hemisphere_image_urls
```

Out[23]:
```
[{'title': 'Cerberus Hemisphere',
  'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/cerberus_enhanced.tif/full.jpg'},
 {'title': 'Schiaparelli Hemisphere',
  'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/schiaparelli_unenhanced.tif/full.jpg'},
 {'title': 'Syrtis Major Hemisphere',
  'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/syrtis_major_unenhanced.tif/full.jpg'},
 {'title': 'Valles Marineris Hemisphere',
  'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/valles_marineris_unenhanced.tif/full.jpg'}]
```

In [24]:
```
mars_data['hemi_urls'] = hemisphere_image_urls
mars_data
```

Out[24]:
```
{'news_title': "Things Are Stacking up for NASA's Mars 2020 Spacecraft",
 'news_p': 'As the July 2020 launch date inches closer, the next spacecraft headed to the Red Planet is assembled for more testing.',
 'featured_image_url': 'https://www.jpl.nasa.gov/spaceimages/images/wallpaper/PIA18905-1920x1200.jpg',
 'mars_weather': 'InSight sol 141 (2019-04-20) low -98.3ºC (-144.9ºF) high -19.7ºC (-3.5ºF)\nwinds from the SW at 4.7 m/s (10.6 mph) gusting to 12.9 m/s (28.8 mph)\npressure at 7.40 hPapic.twitter.com/CQr1QQt3cM',
 'mars_facts': [['Equatorial Diameter:', '6,792 km'],
  ['Polar Diameter:', '6,752 km'],
  ['Mass:', '6.42 x 10^23 kg (10.7% Earth)'],
  ['Moons:', '2 (Phobos & Deimos)'],
  ['Orbit Distance:', '227,943,824 km (1.52 AU)'],
  ['Orbit Period:', '687 days (1.9 years)'],
  ['Surface Temperature:', '-153 to 20 °C'],
  ['First Record:', '2nd millennium BC'],
  ['Recorded By:', 'Egyptian astronomers']],
 'hemi_urls': [{'title': 'Cerberus Hemisphere',
   'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/cerberus_enhanced.tif/full.jpg'},
  {'title': 'Schiaparelli Hemisphere',
   'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/schiaparelli_unenhanced.tif/full.jpg'},
  {'title': 'Syrtis Major Hemisphere',
   'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/syrtis_major_unenhanced.tif/full.jpg'},
  {'title': 'Valles Marineris Hemisphere',
   'img_url': 'http://astropedia.astrogeology.usgs.gov/download/Mars/Viking/valles_marineris_unenhanced.tif/full.jpg'}]}
```