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Seatwork 7.1 Programming Exercise: Data Wrangling with Pandas - Part 1

Using the meteorite data from the Meteorite_Landings.csv file, update the year column to only contain the year, convert it to a numeric data type, and create a new column indicating whether the meteorite was observed falling before 1970. Set the index to the id column and extract all the rows with IDs between 10,036 and 10,040 (inclusive) with loc[].

- Hint 1: Use year.str.slice() to grab a substring.
- Hint 2: Make sure to sort the index before using loc[] to select the range. Bonus: There's a data entry error in the year column. Can you find it? (Don't spend too much time on this.)

```
import pandas as pd

# Meteorite data
meteor_landings = pd.read_csv('Meteorite_Landings.csv')
meteor_landings.head()
```


```
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\"fields\": [\n    {\n      \"column\": \"name\",\n
\"properties\": {\n        \"dtype\": \"string\",\n
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\"Yamato 86722\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
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\"Valid\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
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\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"mass (g)\",\n      \"properties\":
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```

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\"column\": \"fall\",\n      \"properties\": {\n        \"dtype\":
\"category\",\n        \"num_unique_values\": 2,\n        \"samples\":
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\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"year\",\n      \"properties\": {\n
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20.53877\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
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\"samples\": [\n          54.70452,\n          161.37957\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"GeoLocation\",\n
\"properties\": {\n        \"dtype\": \"category\",\n
\"num_unique_values\": 17100,\n        \"samples\": [\n
\"(18.58833, 54.01833)\",\n          \"(-72.77778, 75.32639)\"\n
],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n
}\n    }\n  ]\
n}","type":"dataframe","variable_name":"meteor_landings"}
```


```
# Update the year column to only contain the year
meteor_landings['year'] = meteor_landings['year'].str.slice(6, 10)
meteor_landings['year'] = pd.to_numeric(meteor_landings['year'],
errors='coerce')
meteor_landings.head()
```


```
{"summary":"{\n  \"name\": \"meteor_landings\",\n  \"rows\": 45716,\n
\"fields\": [\n    {\n      \"column\": \"name\",\n
\"properties\": {\n        \"dtype\": \"string\",\n
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\"Yamato 86722\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
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\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
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\"\",\n   \"description\": \"\"\n   }\n   },\n   {\n
\"column\": \"reclat\",\n   \"properties\": {\n   \"dtype\":
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20.53877\n   ],\n   \"semantic_type\": \"\",\n
\"description\": \"\"\n   }\n   },\n   {\n   \"column\":
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\"samples\": [\n   54.70452,\n   161.37957\n   ],\n
\"semantic_type\": \"\",\n   \"description\": \"\"\n   }\
n   },\n   {\n   \"column\": \"GeoLocation\",\n
\"properties\": {\n   \"dtype\": \"category\",\n
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\"(18.58833, 54.01833)\",\n   \"(-72.77778, 75.32639)\"\n
],\n   \"semantic_type\": \"\",\n   \"description\": \"\"\n
}\n   }\n]\
n}","type":"dataframe","variable_name":"meteor_landings"}

```
# Create new column if meteor is falling before 1970
meteor_landings['before_1970'] = meteor_landings['year'].apply(lambda
x: 1 if x < 1970 else 0)
meteor_landings.head()
```

{"summary":"{\n \"name\": \"meteor_landings\",\n \"rows\": 45716,\n
\"fields\": [\n   {\n   \"column\": \"name\",\n
\"properties\": {\n   \"dtype\": \"string\",\n
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\"Grove Mountains 024259\",\n          \"LaPaz Icefield 02382\",\n
\"Yamato 86722\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
\"id\",\n      \"properties\": {\n        \"dtype\": \"number\",\n
\"std\": 16860,\n        \"min\": 1,\n        \"max\": 57458,\n
\"num_unique_values\": 45716,\n        \"samples\": [\n
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\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
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\"Valid\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
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\"num_unique_values\": 12576,\n        \"samples\": [\n
1521.1,\n          56.16\n        ],\n        \"semantic_type\":
\"\",\n        \"description\": \"\"\n      }\n    },\n    {\n
\"column\": \"fall\",\n      \"properties\": {\n        \"dtype\":
\"category\",\n        \"num_unique_values\": 2,\n        \"samples\":
[\n          \"Found\",\n          \"Fell\"\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"year\",\n      \"properties\": {\n
\"dtype\": \"number\",\n        \"std\": 25.052766117706188,\n
\"min\": 860.0,\n        \"max\": 2101.0,\n
\"num_unique_values\": 265,\n        \"samples\": [\n
1857.0,\n          1861.0\n        ],\n        \"semantic_type\":
\"\",\n        \"description\": \"\"\n      }\n    },\n    {\n
\"column\": \"reclat\",\n      \"properties\": {\n        \"dtype\":
\"number\",\n        \"std\": 46.37851135669297,\n        \"min\": -
87.36667,\n        \"max\": 81.16667,\n        \"num_unique_values\":
12738,\n        \"samples\": [\n          21.06917,\n
20.53877\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
\"reclong\",\n      \"properties\": {\n        \"dtype\": \"number\",\
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\"max\": 354.47333,\n        \"num_unique_values\": 14640,\n
\"samples\": [\n          54.70452,\n          161.37957\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"GeoLocation\",\n
\"properties\": {\n        \"dtype\": \"category\",\n
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\"(18.58833, 54.01833)\",\n          \"(-72.77778, 75.32639)\"\n
],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n
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\"description\": \"\"\n      }\n    }\n  ]\
n}","type":"dataframe","variable_name":"meteor_landings"}
```


```
# Set the index to the id column
meteor_landings.set_index('id', inplace=True)
meteor_landings.head()
```


```
{"summary":"{\n  \"name\": \"meteor_landings\",\n  \"rows\": 45716,\n
\"fields\": [\n    {\n      \"column\": \"id\",\n      \"properties\":
{\n        \"dtype\": \"number\",\n        \"std\": 16860,\n
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45716,\n        \"samples\": [\n          50216,\n          12649,\n
30228\n        ],\n        \"semantic_type\": \"\",\n
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\"name\",\n      \"properties\": {\n        \"dtype\": \"string\",\n
\"num_unique_values\": 45716,\n        \"samples\": [\n
\"Grove Mountains 024259\",\n          \"LaPaz Icefield 02382\",\n
\"Yamato 86722\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
\"nametype\",\n      \"properties\": {\n        \"dtype\":
\"category\",\n        \"num_unique_values\": 2,\n        \"samples\":
[\n          \"Relict\",\n          \"Valid\"\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"recclass\",\n      \"properties\":
{\n        \"dtype\": \"category\",\n        \"num_unique_values\":
466,\n        \"samples\": [\n          \"H5-6\",\n
\"CO3.3\"\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
\"mass (g)\",\n      \"properties\": {\n        \"dtype\":
\"number\",\n        \"std\": 574988.87641047,\n        \"min\": 0.0,\
n        \"max\": 60000000.0,\n        \"num_unique_values\": 12576,\n
\"samples\": [\n          1521.1,\n          56.16\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"fall\",\n      \"properties\": {\n
\"dtype\": \"category\",\n        \"num_unique_values\": 2,\n
\"samples\": [\n          \"Found\",\n          \"Fell\"\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"year\",\n      \"properties\": {\n
\"dtype\": \"number\",\n        \"std\": 25.052766117706188,\n
\"min\": 860.0,\n        \"max\": 2101.0,\n
\"num_unique_values\": 265,\n        \"samples\": [\n
1857.0,\n          1861.0\n        ],\n        \"semantic_type\":
\"\",\n        \"description\": \"\"\n      }\n    },\n    {\n
\"column\": \"reclat\",\n      \"properties\": {\n        \"dtype\":
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```

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20.53877\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
\"reclong\",\n      \"properties\": {\n        \"dtype\": \"number\",\
n        \"std\": 80.64729807906366,\n        \"min\": -165.43333,\n
\"max\": 354.47333,\n        \"num_unique_values\": 14640,\n
\"samples\": [\n          54.70452,\n          161.37957\n        ],\n
\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
n    },\n    {\n      \"column\": \"GeoLocation\",\n
\"properties\": {\n        \"dtype\": \"category\",\n
\"num_unique_values\": 17100,\n        \"samples\": [\n
\"(18.58833, 54.01833)\",\n          \"(-72.77778, 75.32639)\"\n
],\n        \"semantic_type\": \"\",\n        \"description\": \"\"\n
}\n    },\n    {\n      \"column\": \"before_1970\",\n
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\"num_unique_values\": 2,\n        \"samples\": [\n          0,\n
1\n        ],\n        \"semantic_type\": \"\",\n
\"description\": \"\"\n      }\n    }\n  ]\
n}","type":"dataframe","variable_name":"meteor_landings"}
```


```
# Extract all the rows with IDs between 10,036 and 10,040 (inclusive)
with loc[].
meteor_landings_sorted = meteor_landings.sort_index()
meteor_landings_sorted.loc[10036:10040]
```


```
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n        \"description\": \"\"\n      }\n    },\n    {\n
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\"Enigma\"\n        ],\n        \"semantic_type\": \"\",\n
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\"description\": \"\"\n      }\n    },\n    {\n      \"column\":
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\"semantic_type\": \"\",\n        \"description\": \"\"\n      }\
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```

```
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