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Student number: 984159

Aim (aim):

From this visualisation we can see time periods of different civilization from the ancient history to nowadays from different continents.

Visual Design Type (vistype):

Interactive scatter plot with tooltip

Visual Mappings (vismapping):

X axis: minimum date

Y axis: maximum date

color: Depending on the continent

tooltip: Period Name

Data Preparation (dataprep):

Using the coordinates provided I have tried to represent each raw with it's continent using a formula created in Excel file.

Improvements (improvements):

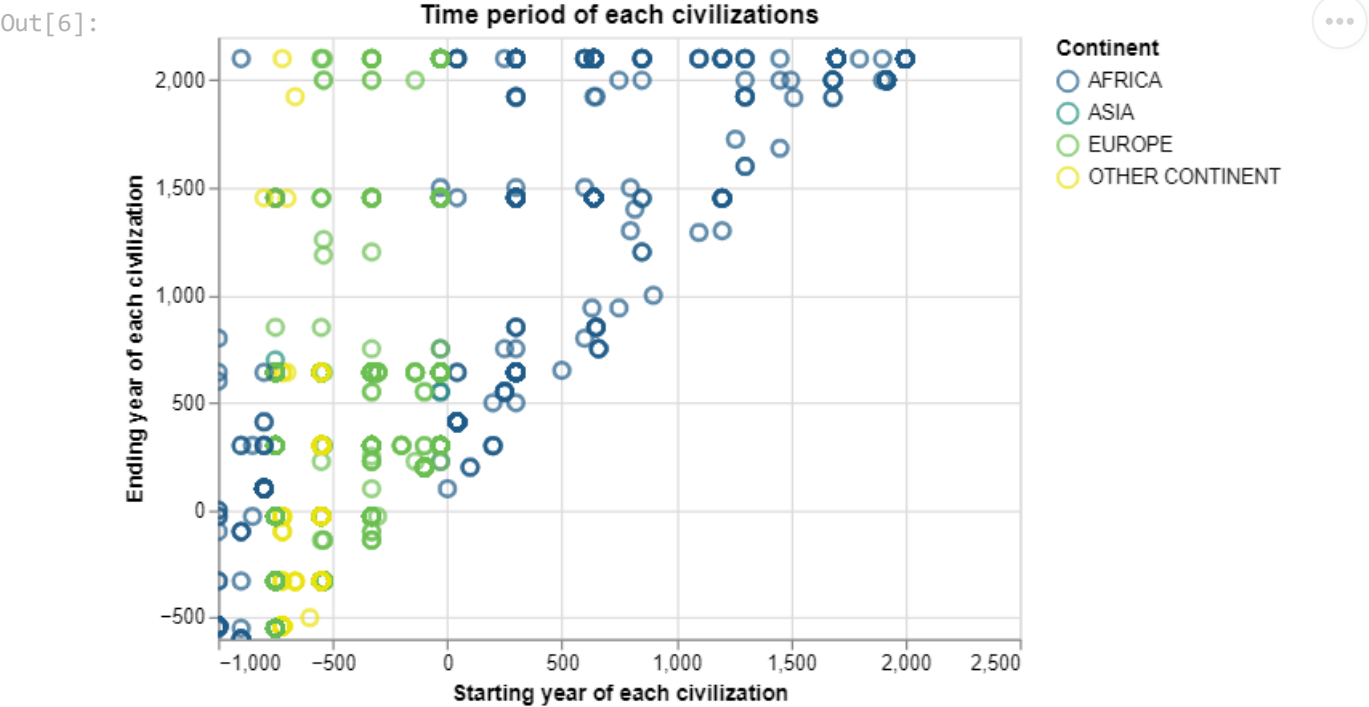
The continents might not be very accurate as it is hard to determine continents based on longitute and latitude.

```
In [ ]: import altair as alt
import pandas as pd
from vega_datasets import data
```

```
In [4]: data = pd.read_csv('pleiades-locations.csv')
```

```
In [5]: alt.data_transformers.disable_max_rows()
points = alt.Chart(data).mark_point(size=60).encode(
    alt.X('minDate', axis = alt.Axis(title = "Starting year of each civilization"),
        scale=alt.Scale(domain=(-1000, 2100))
    ),
    alt.Y('maxDate',axis = alt.Axis(title = "Ending year of each civilization"),
        scale=alt.Scale(domain=(-600, 2100))
    ),
    color=alt.Color('Continent', scale=alt.Scale(scheme='darkmulti')),
    tooltip=[alt.Tooltip
        ('timePeriodsRange', title="Span time"),
        alt.Tooltip
        ('Continent', title="Continent"),
        alt.Tooltip
        ('timePeriodsKeys', title="Period name"),
        alt.Tooltip
        ('timePeriods', title="Abreviation")
    ]
).interactive().properties(
    title ="Time period of each civilizations"
)
```

```
In [6]: points
```



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Aim (aim):

A visual representation of numbers of civilization in each continent and different period of times

Visual Design Type (vistype):

Interval selection scatter plot and bar chart

Visual Mappings (vismapping):

X axis: minimum date

Y axis: maximum date

color: Depending on the continent

size of circles: existence period

Data Preparation (dataprep):

For existence period I have subtracted maxDate and minDate.

Using the coordinates provided I have tried to represent each raw with it's continent using a formula created in Excel file.

Improvements (improvements):

As some civilizations in different continents lived in the same period of time you can't visualise on the scatter plot, but you can see them on the bar chart.

```
In [2]: import altair as alt
import pandas as pd
from vega_datasets import data

In [3]: data = pd.read_csv('prehistory-modern.csv')

In [4]: scale = alt.Scale(domain=['EUROPE', 'ASIA', 'AFRICA', 'OTHER CONTINENT'],
range=['#0AC734', '#0AB1E0', '#EBB10D', "#DC0EF0"])
color = alt.Color('Continent:N', scale=scale)

In [5]: brush = alt.selection_interval(encodings=['x'])
click = alt.selection_multi(encodings=['color'])

In [6]: alt.data_transformers.disable_max_rows()
points = alt.Chart().mark_point().encode(
    alt.X('minDate', axis = alt.Axis(title = "Starting year of each civilization")),

),
alt.Y('maxDate',axis = alt.Axis(title = "Ending year of each civilization"),

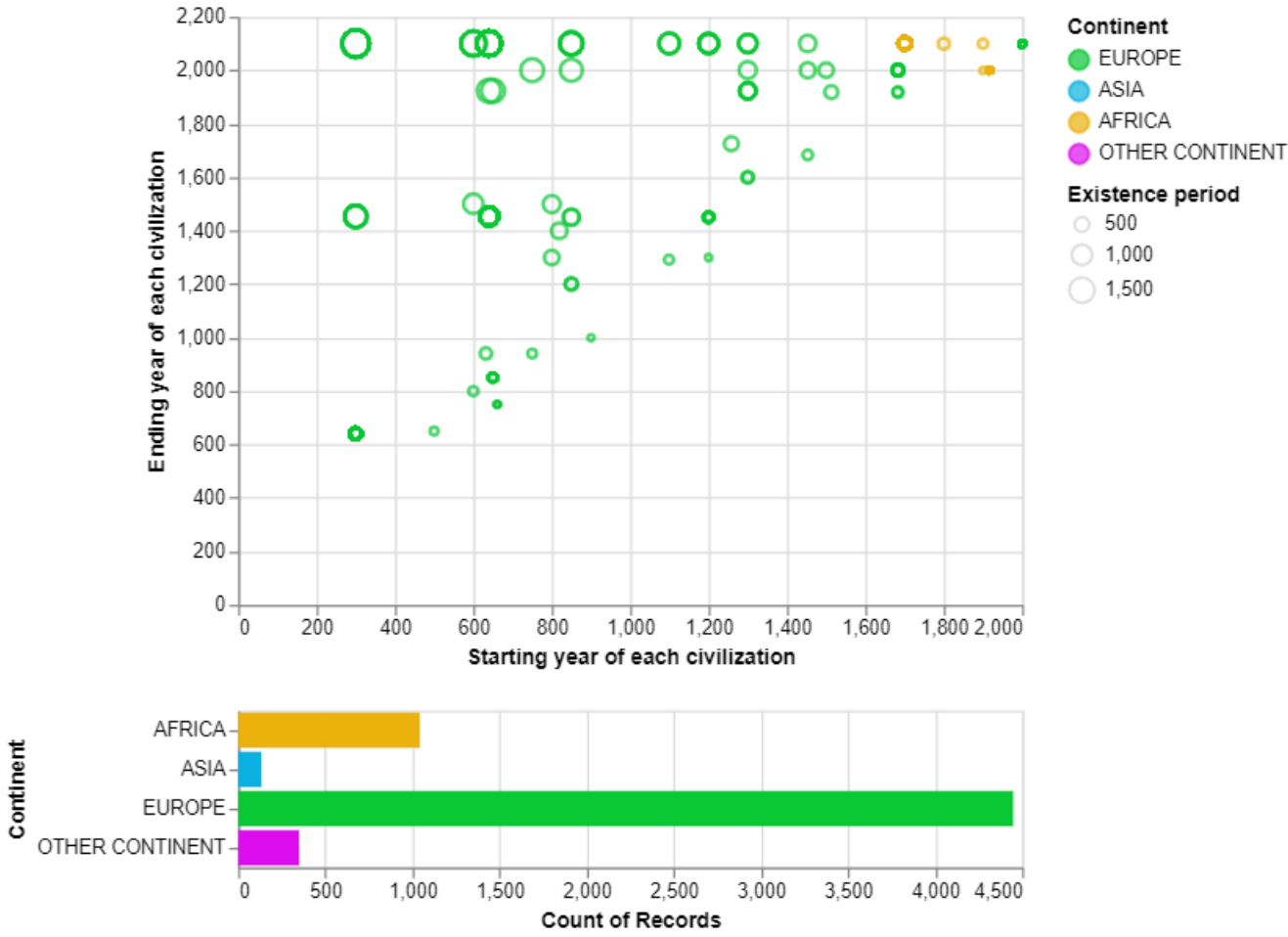
),
color=alt.condition(brush, color, alt.value('lightgray')),
size=alt.Size('Existence period:Q', scale=alt.Scale(range=[0, 200]))
).properties(
).add_selection(
    brush
).transform_filter(
    click
)

In [7]: bars = alt.Chart().mark_bar().encode(
    x='count()',
    y='Continent:N',
    color=alt.condition(click, color, alt.value('lightgray')),
).transform_filter(
    brush
).properties(
).add_selection(
    click
)

In [8]: alt.vconcat(
    points,
    bars,
    data=data,
    title="Number of civilizations in prehistory,middle ages and early modern"
)
```

Out[8]:

Number of civilizations in prehistory,middle ages and early modern



In [ ]:

In [ ]:

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Aim (aim):

A map representation of an ancient city with the oldest locations.

Visual Design Type (vistype):

World projection with dots.

Visual Mappings (vismapping):

Points are represented depending on latitude and longitude

Tooltip to see the oldest date along with period names

Highlighting all other points with the same oldest date.

Data Preparation (dataprep):

I have sorted the data set depending on the minimum date. And took all the data that had the minimum date < -400 **Improvements (improvements):**

It's hard to determine each location as there are a lot of settlements(e.g. Italy) An improvement could be to make the map zoomable

```
In [1]: import altair as alt
import pandas as pd
from vega_datasets import data

In [2]: # data generators for background
sphere = alt.sphere()
graticule = alt.graticule()

In [3]: #import data and map
alt.data_transformers.disable_max_rows()
source = alt.topo_feature(data.world_110m.url, 'countries')
data = pd.read_csv('Prehistory.csv')

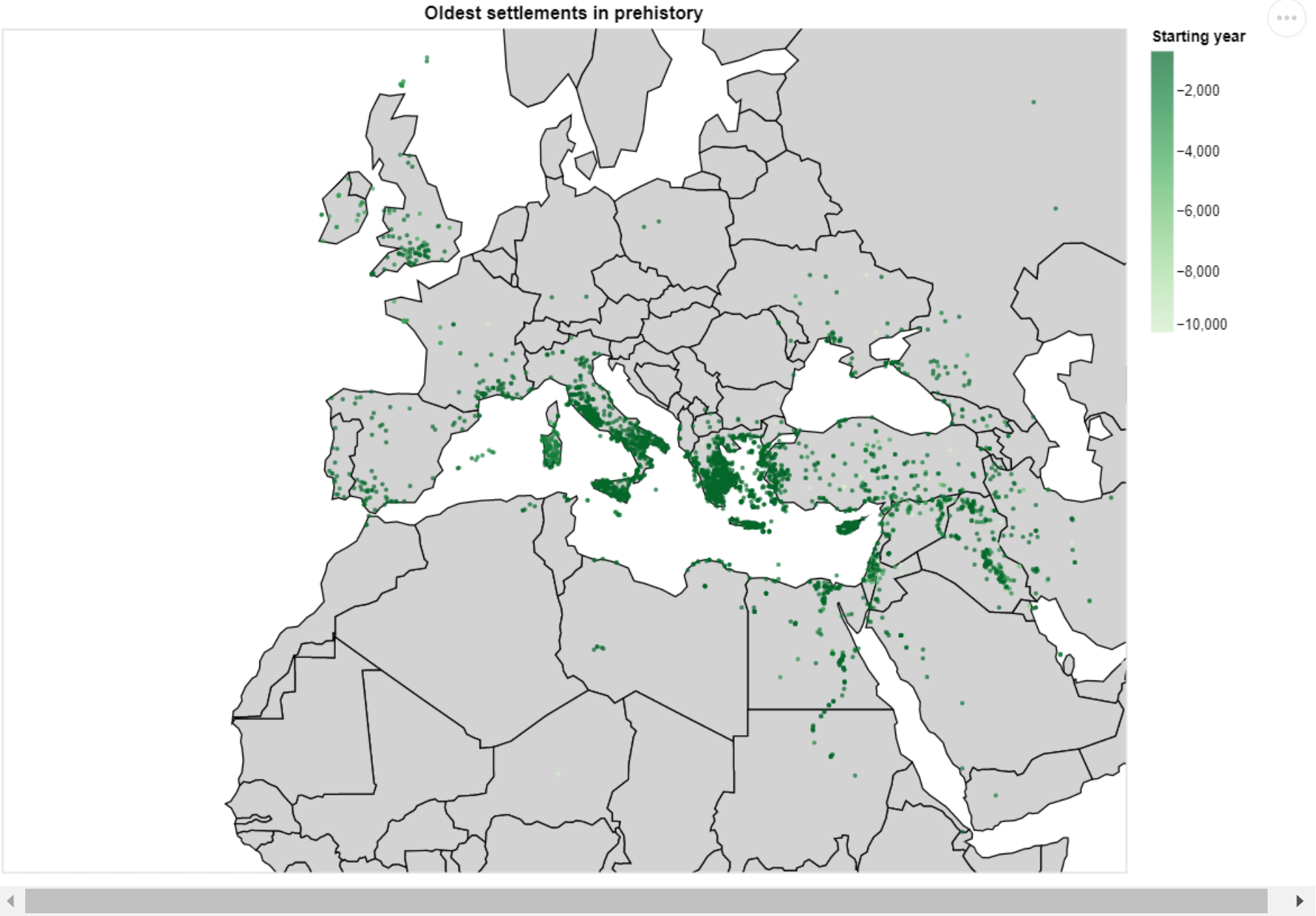
In [4]: background = alt.Chart(source).mark_geoshape(
    fill='lightgray',
    stroke='black'
).project(
    type= 'mercator',
    center = [10,40],
    scale=500,
).properties(
    title='Oldest settlements in prehistory',
    width=800,
    height=600,
)

In [5]: highlight = alt.selection_single(on='mouseover', fields=['minDate'], empty='none')

In [6]: points = alt.Chart(data).mark_circle(
    size=9,
    color='steelblue'
).encode(
    longitude='reprLong:Q',
    latitude='reprLat:Q',
    tooltip=[alt.Tooltip
        ('featureType', title="Type of settlement"),
        alt.Tooltip
        ('reprLong', title="Longitudinal coordinate"),
        alt.Tooltip
        ('reprLat', title="Latitudinal coordinate"),
        alt.Tooltip
        ('description', title="description"),
        alt.Tooltip
        ('minDate', title="Starting year")
    ],
    color=alt.condition(highlight, alt.value('red'),
        'minDate:Q',
        title = "Starting year",
        scale=alt.Scale(scheme='greens'))
).add_selection(
    highlight
).project(
    scale = 500,
    center = [10,40],
)
```

```
In [7]: background + points
```

Out[7]:



```
In [ ]:
In [ ]:
In [ ]:
In [ ]:
```

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Aim (aim):

A visual representation of how settlements evolved e early modern ages depending on major feature types

Visual Design Type (vistype):

Interactive Chart with Cross-Highlight

Visual Mappings (vismapping):

minimum date,maximum date, number of occurences in different periods of time, major feature types

Data Preparation (dataprep):

Bar Chart: number of apparition of each settlement type and took only the feature types that occured frequently

Interactive Chart: number of occurences in different periods of time and size of the circle depending on the number of appearance

Improvements (improvements):

The feature types are not the most relevant ones as the most occured ones are not the one created by humans(e.g island or mountein).

```
In [12]: import altair as alt
import pandas as pd
from vega_datasets import data

In [13]: data = pd.read_csv('emodern.csv')

In [14]: pts = alt.selection(type="single", encodings=['y'])

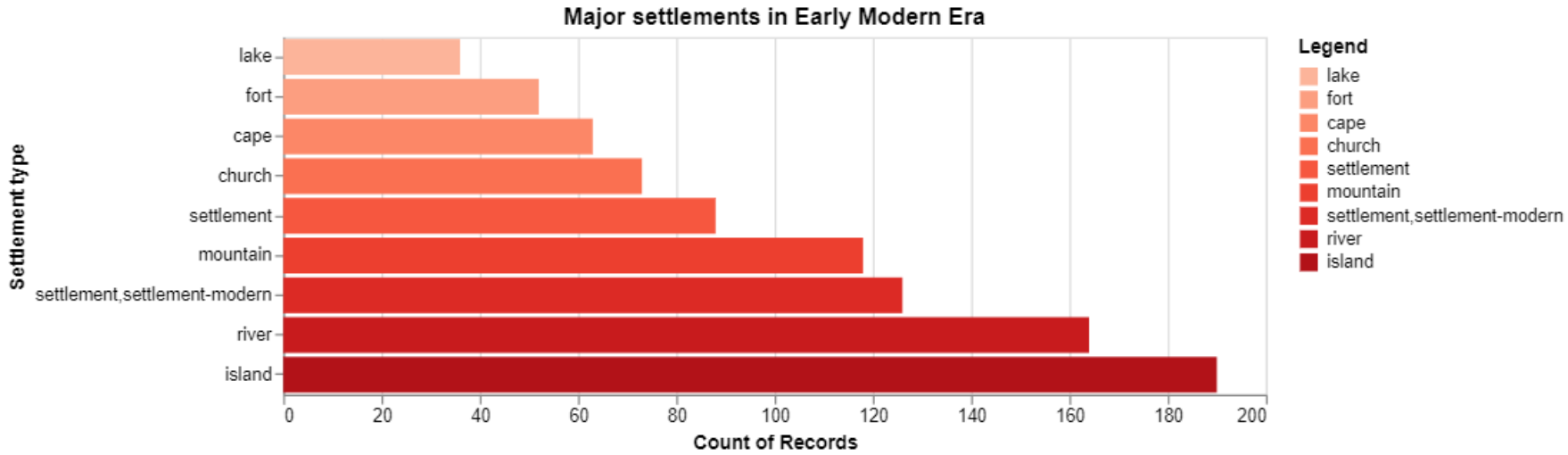
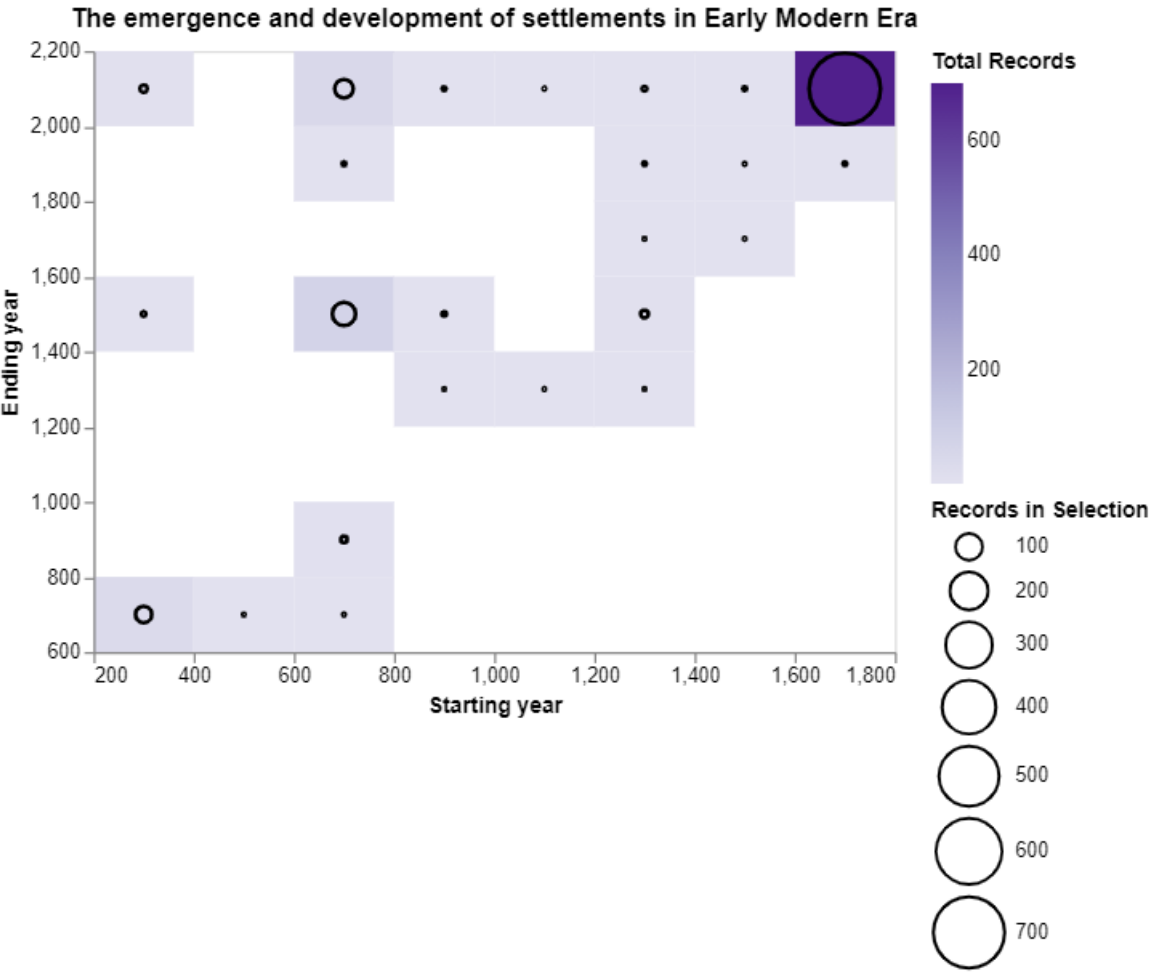
In [15]: circ = rect.mark_point().encode(
    alt.ColorValue('black'),
    alt.Size('count()',
        legend=alt.Legend(title='Records in Selection')
    )
).transform_filter(
    pts
)

In [16]: rect = alt.Chart(data).mark_rect().encode(
    alt.X('minDate:Q', bin=True, title="Starting year"),
    alt.Y('maxDate:Q', bin=True, title="Ending year"),
    alt.Color('count()',
        scale=alt.Scale(scheme='purples'),
        legend=alt.Legend(title='Total Records')
    )
).properties(
    title = "The emergence and development of settlements in Early Modern Era"
)

In [17]: bar = alt.Chart(data).mark_bar().encode(
    alt.X('count()'),
    alt.Y("featureType:N", axis = alt.Axis(title="Settlement type"),sort = "x"),
    color = alt.Color("featureType:N", scale=alt.Scale(scheme="reds"),sort = "x",title="Legend"),
).properties(
    title = "Major settlements in Early Modern Era",
    width=550,
    height=200
).add_selection(pts)

In [18]: alt.vconcat(
    rect + circ,
    bar
).resolve_legend(
    color="independent",
    size="independent"
)

Out[18]:
```



In [ ]:

In [ ]:

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**Aim (aim):**

A visual representation of starting year of different timpe periods in modern era

**Visual Design Type (vistype):**

Parallel coordinates

**Visual Mappings (vismapping):**

value of years from 0 to 2100 for y

key: minimum date to maximum date for each period for x time periods keys

**Data Preparation (dataprep):**

I have selected all the data where the minimum date was higher than 1750

**Improvements (improvements):**

Not enough data for all the time periods as the all time periods have started in the same year for all locations.

In [69]:

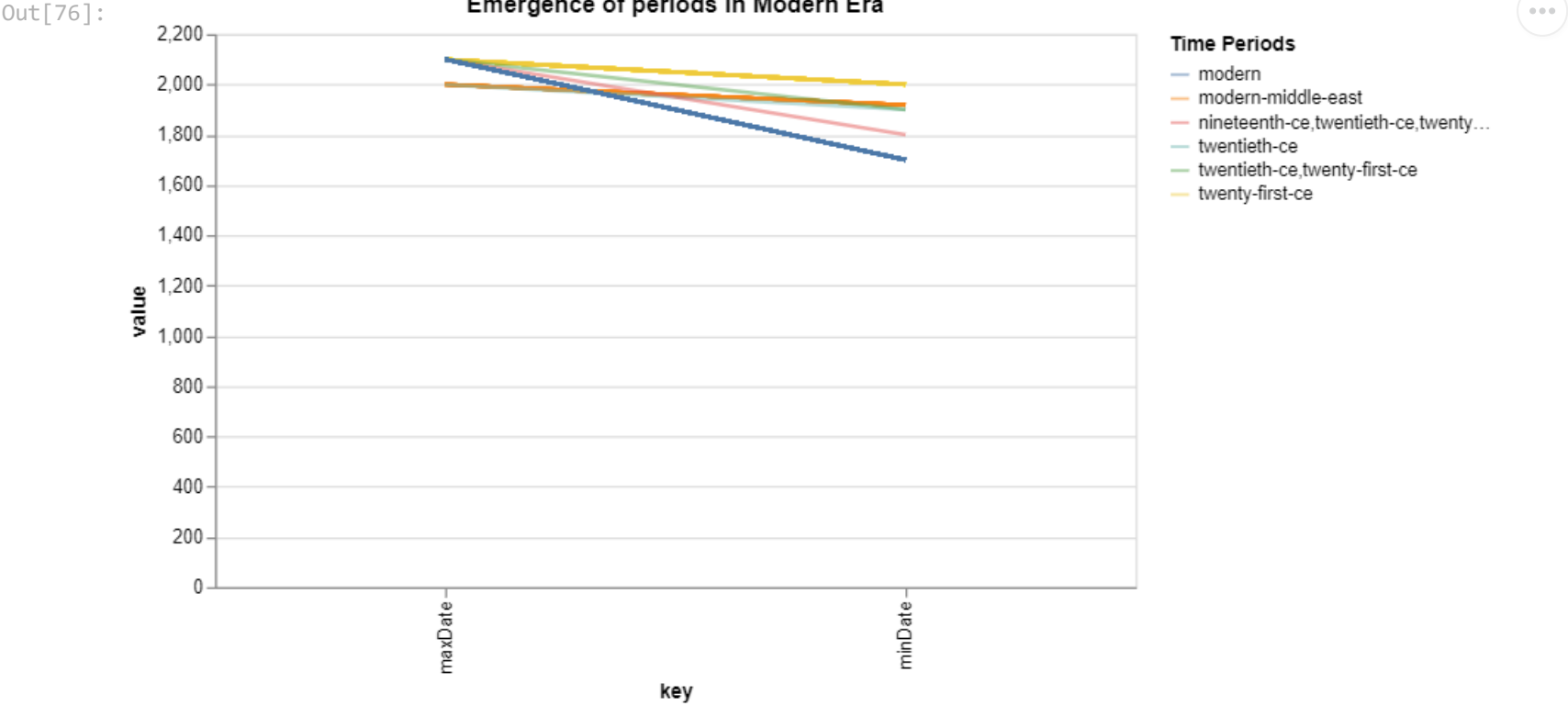
```
import altair as alt
import pandas as pd
from vega_datasets import data
from altair import datum
```

In [70]:

```
data = pd.read_csv('Modern.csv')
```

In [76]:

```
alt.data_transformers.disable_max_rows()
alt.Chart(data).transform_window(
    index='count()'
).transform_fold(
    ['minDate', 'maxDate']
).mark_line().encode(
    x=('key:N'),
    y=('value:Q'),
    color=alt.Color('timePeriodsKeys:N',title="Time Periods"),
    detail='index:N',
    opacity=alt.value(0.5)
).properties(width=500,
    title="Emergence of periods in Modern Era").interactive()
```



In [ ]:

In [ ]: