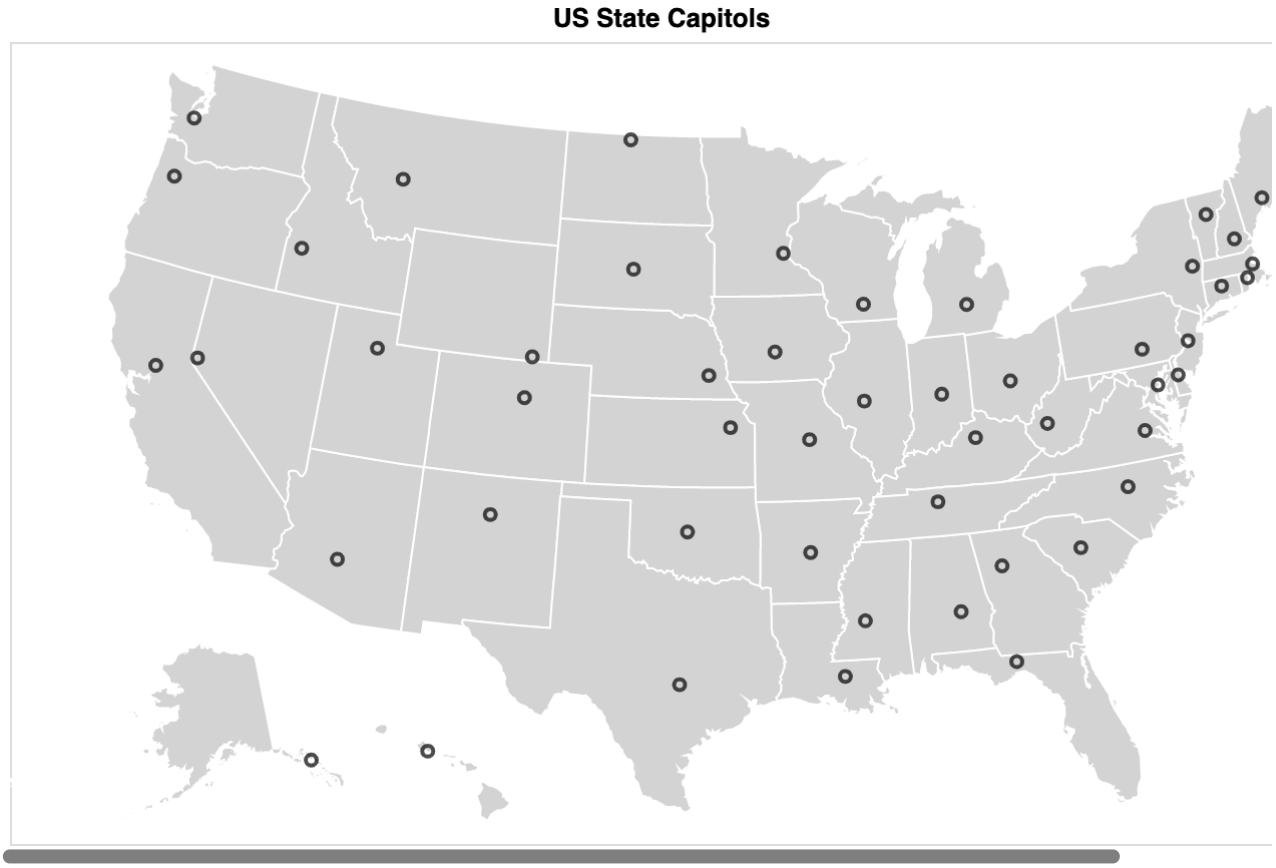
U.S. state capitals overlayed on a map of the U.S

This is a layered geographic visualization that shows US capitals overlayed on a map.

In [34]:

```
import altair as alt
from vega_datasets import data

states = alt.topo_feature(data.us_10m.url, 'states')
capitals = data.us_state_capitals.url

# US states background
background = alt.Chart(states).mark_geoshape(
    fill='lightgray',
    stroke='white'
).properties(
    title='US State Capitols',
    width=650,
    height=400
).project('albersUsa')

# Points and text
hover = alt.selection(type='single', on='mouseover', nearest=True,
                      fields=['lat', 'lon'])

base = alt.Chart(capitals).encode(
    longitude='lon:Q',
    latitude='lat:Q',
)

text = base.mark_text(dy=-5, align='right').encode(
    alt.Text('city', type='nominal'),
    opacity=alt.condition(~hover, alt.value(0), alt.value(1))
)

points = base.mark_point().encode(
    color=alt.value('black'),
    size=alt.condition(~hover, alt.value(30), alt.value(100))
).add_selection(hover)

background + points + text
```

Out[34]:



US Population Over Time

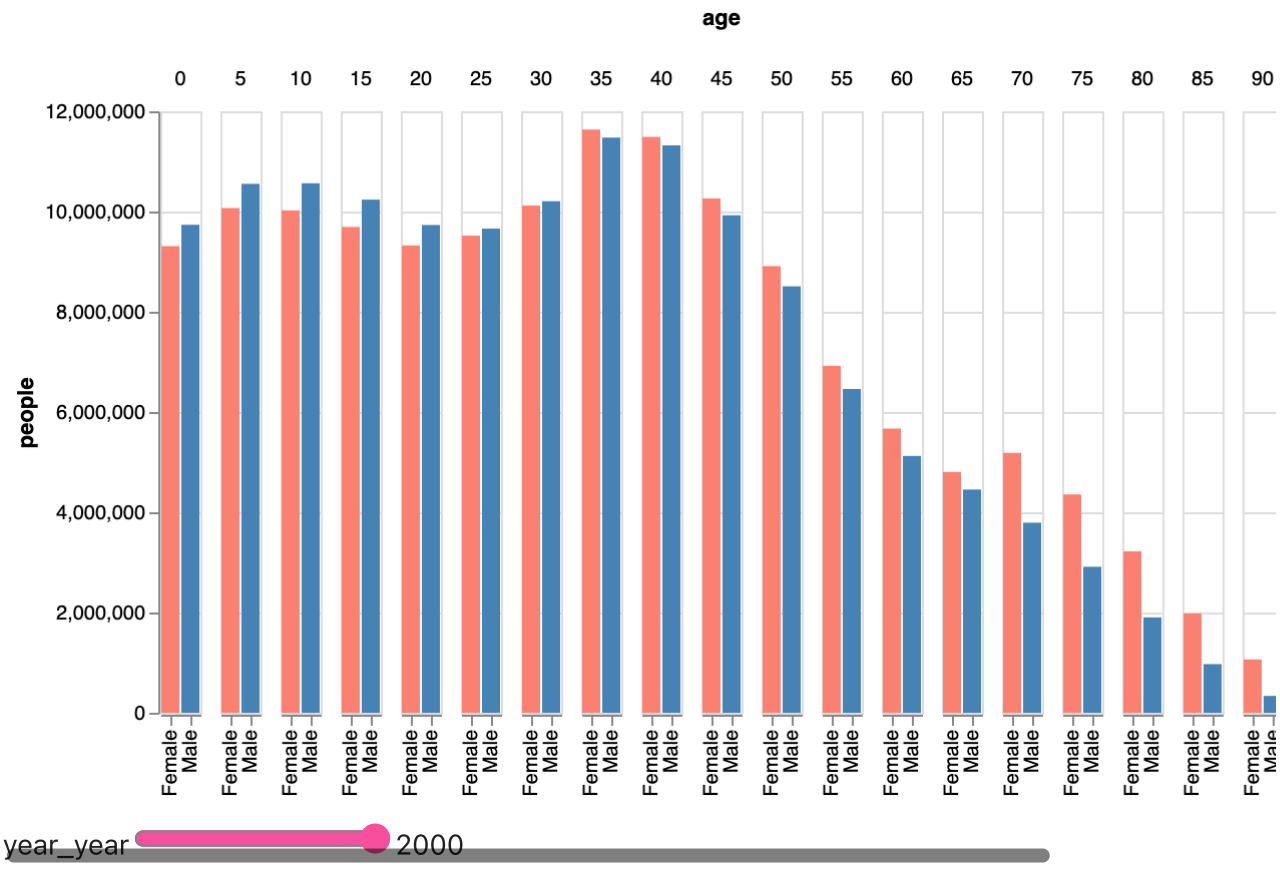
This chart visualizes the age distribution of the US population over time. It uses a slider widget that is bound to the year to visualize the age distribution over time.

In [35]:

```
source = data.population.url

pink_blue = alt.Scale(domain=('Male', 'Female'),
                      range=["steelblue", "salmon"])

slider = alt.binding_range(min=1900, max=2000, step=10)
select_year = alt.selection_single(name="year", fields=['year'],
                                   bind=slider, init={'year': 2000})

alt.Chart(source).mark_bar().encode(
    x=alt.X('sex:N', title=None),
    y=alt.Y('people:Q', scale=alt.Scale(domain=(0, 12000000))),
    color=alt.Color('sex:N', scale=pink_blue),
    column='age:O'
).properties(
    width=20
).add_selection(
    select_year
).transform_calculate(
    "sex", alt.expr.if_(alt.datum.sex == 1, "Male", "Female")
).transform_filter(
    select_year
).configure_facet(
```

```
    spacing=8
)
```

Out[35]:



US Population Pyramid Over Time

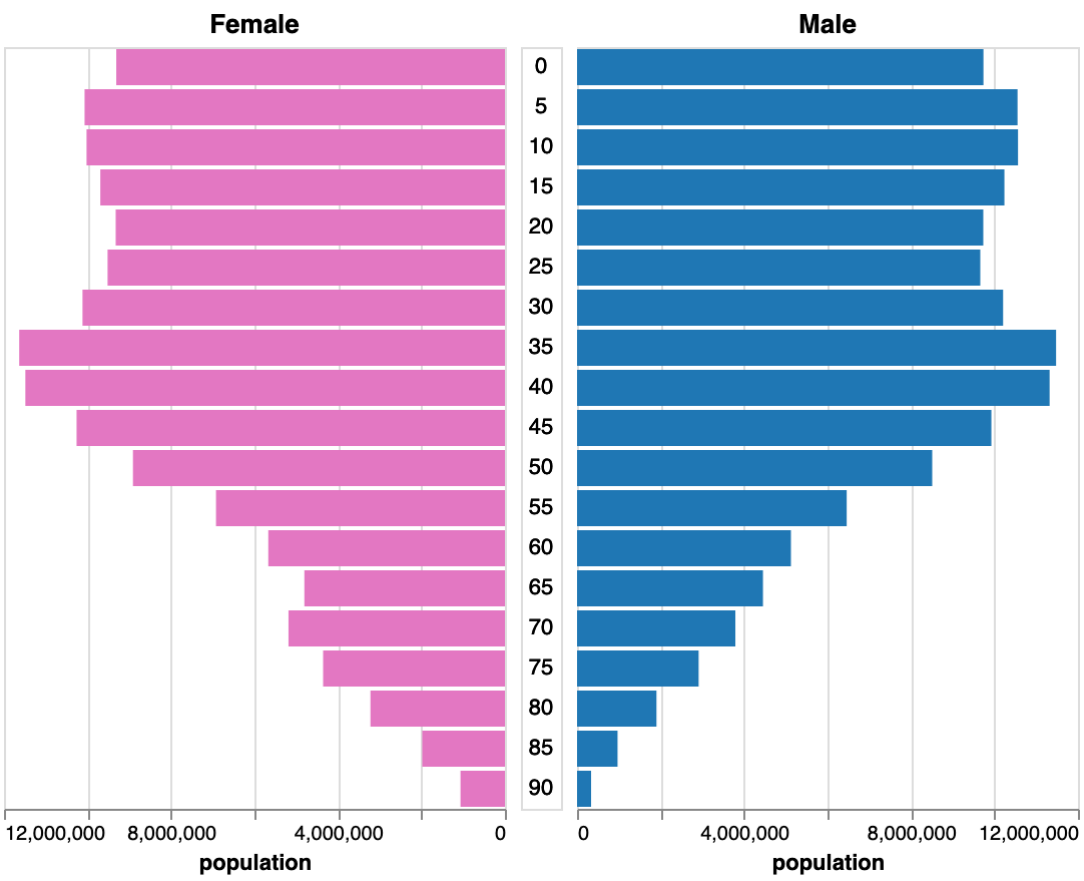
A population pyramid shows the distribution of age groups within a population. It uses a slider widget that is bound to the year to visualize the age distribution over time.

In [36]:

```
slider = alt.binding_range(min=1850, max=2000, step=10)
select_year = alt.selection_single(name='year', fields=['year'],
                                   bind=slider, init={'year': 2000})

base = alt.Chart(source).add_selection(
    select_year
).transform_filter(
    select_year
).transform_calculate(
    gender=alt.expr.if_(alt.datum.sex == 1, 'Male', 'Female')
).properties(
    width=250
)


color_scale = alt.Scale(domain=['Male', 'Female'],
                        range=['#1f77b4', '#e377c2'])

left = base.transform_filter(
    alt.datum.gender == 'Female'
).encode(
```

```
    y=alt.Y('age:O', axis=None),
    x=alt.X('sum(people):Q',
            title='population',
            sort=alt.SortOrder('descending')),
    color=alt.Color('gender:N', scale=color_scale, legend=None)
).mark_bar().properties(title='Female')

middle = base.encode(
    y=alt.Y('age:O', axis=None),
    text=alt.Text('age:Q'),
).mark_text().properties(width=20)

right = base.transform_filter(
    alt.datum.gender == 'Male'
).encode(
    y=alt.Y('age:O', axis=None),
    x=alt.X('sum(people):Q', title='population'),
    color=alt.Color('gender:N', scale=color_scale, legend=None)
).mark_bar().properties(title='Male')

alt.concat(left, middle, right, spacing=5)
```

Out[36]:



US Population: Wrapped Facet

This chart visualizes the age distribution of the US population over time, using a wrapped faceting of the data by decade.

In [37]:
```
alt.Chart(source).mark_area().encode(
    x='age:O',
    y=alt.Y(
        'sum(people):Q',
        title='Population',
        axis=alt.Axis(format='~s')
    ),
    facet=alt.Facet('year:O', columns=5),
).properties(
    title='US Age Distribution By Year',
    width=90,
    height=80
)
```

Out[37]: