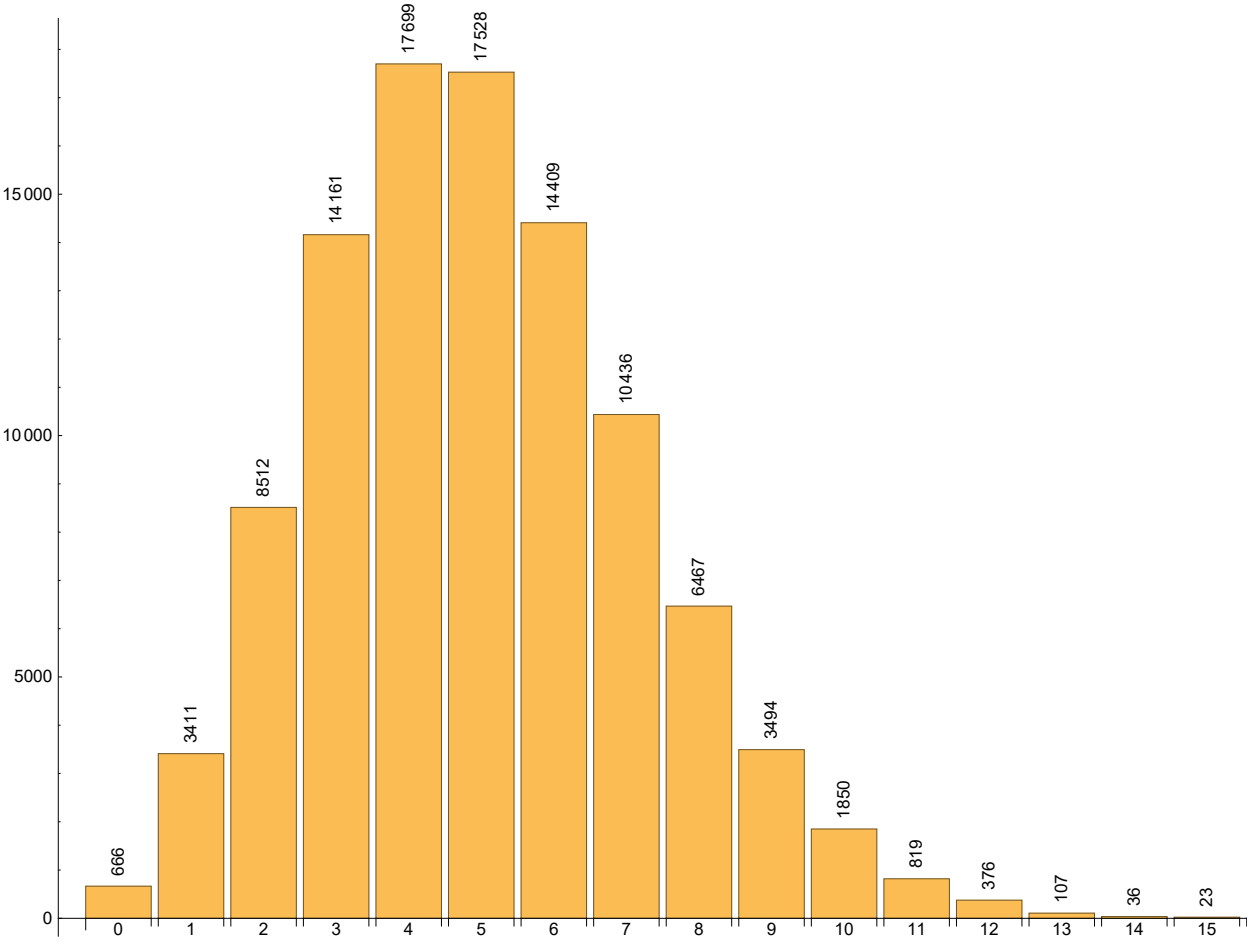
In[ ]:=
```
Module[{peoplePerDay =
    KeySort[Counts@With[{λ = 2}, RandomVariate[PoissonDistribution[5], 100 000]]]},
 BarChart[peoplePerDay, LabelingFunction → (Placed[Rotate[#, 90 °], Above] &),
  ChartLabels → Automatic, ImageSize → 788]]
```

Out[ ]=



In[1]:=
```
ClearAll[genderDivide]

genderDivide[n_, p_: 0.5] :=
 Module[{genderDivide = RandomChoice[{p, 1 - p} → {0, 1}, n]},
  {Count[genderDivide, 0], Count[genderDivide, 1]}]

Table[
 Module[{plot},
  plot = BarChart[Plus @@@
     GatherBy[genderDivide[#, p] & /@ Sort@RandomVariate[PoissonDistribution[5], 10000],
      Total@# &],
    ChartLayout → "Stacked",
    LabelingFunction → (Placed[Rotate[#, 90 °], Above] &),
    Frame → True, PlotLabel → Style["Probability for females = " <> ToString@p, 20],
    FrameLabel → (Style[#, 15] & /@ {"Stacked Counts", "Total number of people"}),
    ImageSize → 788, ChartLegends → {"Female", "Male"}];
  Export[StringReplace[NotebookFileName[],
    ".nb" → "_stacked_chart_" <> ToString[Round[10 p]] <> ".svg"], plot,
   ImageSize → 1000, ImageResolution → 800]
 ]
 , {p, 0.1, 0.9, 0.1}]
```

Out[3]=
```
{D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_1.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_2.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_3.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_4.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_5.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_6.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_7.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_8.svg, D:\Mathematica Files
   4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_10_example_3.023\sheldon_ross_
   10_example_3.023_stacked_chart_9.svg}
```

In[•]:=
```
Export[StringReplace[NotebookFileName[], ".nb" → "_theoretical_all.png"], Column[
 {ListLinePlot[Table[{n, e^-10 # (10 #)^n/n!}, {n, 0, 25}] & /@ Range[0.1, 0.9, 0.1], PlotRange →
    All, PlotLegends → ("p = " <> ToString[#] & /@ Range[0.1, 0.9, 0.1]), ImageSize → 788],
  ListLinePlot[Table[e^-10 (1-#) (10 (1 - #))^n/n!, {n, 0, 25}] & /@ Range[0.1, 0.9, 0.1],
   PlotRange → All, PlotLegends → ("(1-p) = " <> ToString[#] & /@ Range[0.1, 0.9, 0.1]),
   ImageSize → 788]}], ImageSize → 788]
```

Out[•]=
```
D:\Mathematica Files
4K\sheldon_ross\sheldon_ross_chapter_03\sheldon_ross_example_3.23\sheldon_ross_example
_3.23_theoretical_all.png
```

```
Table[
 Module[{images}, images = ListLinePlot[With[{p = p}, {
        Table[If[n == #, Callout[{n, e^-10 (1-p) (10 (1 - p))^n/n!}, n, Above],
          {n, e^-10 (1-p) (10 (1 - p))^n/n!}], {n, 0, 25}],
        Table[If[n == 20 - #, Callout[{n, e^-10 (p) (10 (p))^n/n!}, 20 - #, Above],
          {n, e^-10 (p) (10 (p))^n/n!}], {n, 0, 25}]}],
     Frame → True, FrameLabel → {"n+m", "P{i=n+m}"},
     PlotRange → {{0, 25}, {0, 0.5}},
     PlotLegends → {"Male", "Female"},
     PlotLabel → "P{female} = " <> ToString[p] <> " & p{male} = " <> ToString[1 - p]] & /@
   Range[0, 20];

  Export[StringReplace[NotebookFileName[],
    ".nb" → "_theoretical_dists_p_" <> ToString[p] <> ".gif"], images,
   ImageSize → 788, ImageResolution → 300, "DisplayDurations" → 0.5];
  Print["Exported for p = " <> ToString[p]]
 ]
 , {p, 0.1, 0.9, 0.1}]
```

During evaluation of In[6]:=
Exported for p = 0.1

During evaluation of In[6]:=
Exported for p = 0.2

During evaluation of In[6]:=
Exported for p = 0.3

During evaluation of In[6]:=
Exported for p = 0.4

During evaluation of In[6]:=
Exported for p = 0.5

During evaluation of In[6]:=
Exported for p = 0.6

During evaluation of In[6]:=
Exported for p = 0.7

During evaluation of In[6]:=
Exported for p = 0.8

During evaluation of In[6]:=
Exported for p = 0.9

Out[•]= {Null, Null, Null, Null, Null, Null, Null, Null, Null}

In[4]:=
```
SetOptions[SelectedNotebook[],
 PrintingStyleEnvironment → "Printout", ShowSyntaxStyles → True]
```