In[2]:=
```
P[n_] := With[{S = n (n + 1) / 2},
  NestList[Table[Total[#[[Max[1, s - n] ;; s - 1]]], {s, S}] &,
   Table[If[s ≤ n, 1, 0], {s, S}], n - 1]]
```

In[9]:=
```
n = 150;
pmat = P[n]; // AbsoluteTiming
```

Out[10]=
```
{37.0619, Null}
```

In[11]:=
```
Rv[l_, s_] := Module[{r = RandomInteger[pmat[[l + 1, s]] - 1], p = pmat[[l]]},
  Catch[
   Do[With[{w = p[[d]]}, If[r < w, Throw[s - d], r = r - w]], {d, Max[1, s - n], s - 1}]]]
```

In[12]:=
```
Sample[] :=
 Reap[Module[{s = n (n + 1) / 2, v},
    Do[If[l == 0, Sow[s],
      v = Rv[l, s];
      Sow[v];
      s = s - v]
     , {l, n - 1, 0, -1}]]][[2, 1]]
```

In[14]:=
```
samples = ParallelTable[Sample[], {i, 40 000}]; // AbsoluteTiming
```

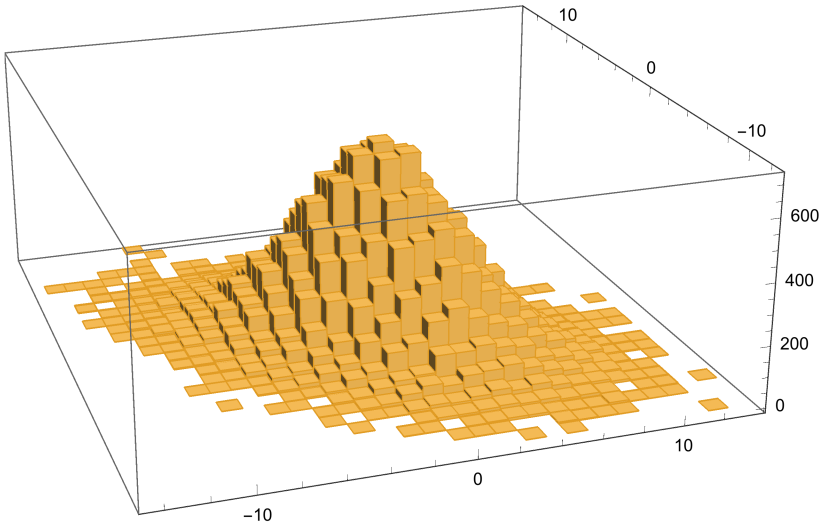
Out[14]=
```
{663.653, Null}
```

In[15]:=
```
v[s_, j_] := Count[s, v_ /; v ≤ j] - j
```

In[16]:=
```
points = Map[{v[#, n / 3], v[#, 2 n / 3]} &, samples];
```

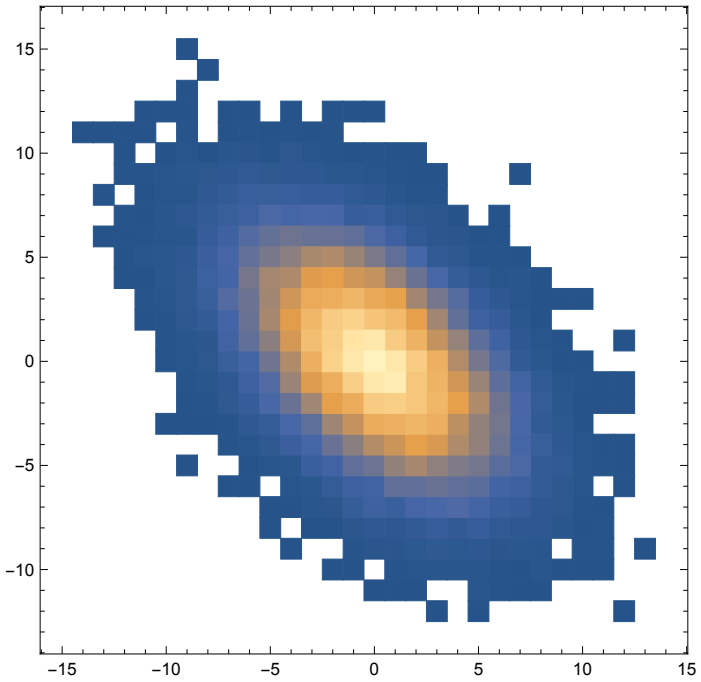
In[17]:=
```
Histogram3D[points, {1}]
```

Out[17]=



In[18]:=
```
DensityHistogram[points, {1}]
```

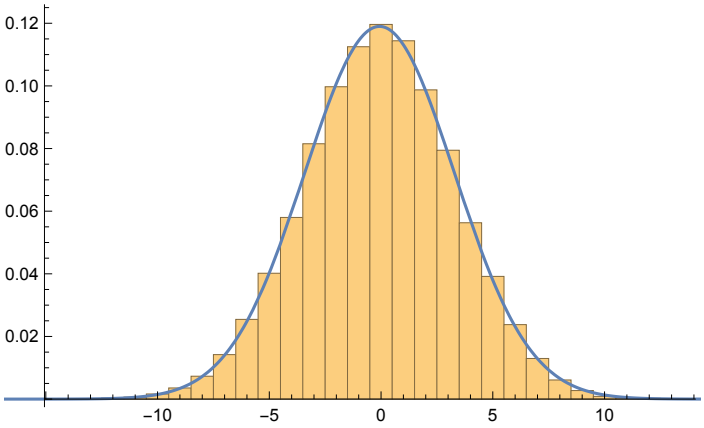
Out[18]=



In[27]:=
```
xpoints = Map[#[[1]] &, points];
xfit = EstimatedDistribution[xpoints, NormalDistribution[mu, sigma]]
Show[Histogram[xpoints, {1}, "PDF"],
 Plot[PDF[xfit, x], {x, -20, 20}, PlotRange → All]]
```

Out[28]=
```
NormalDistribution[-0.066325, 3.35274]
```

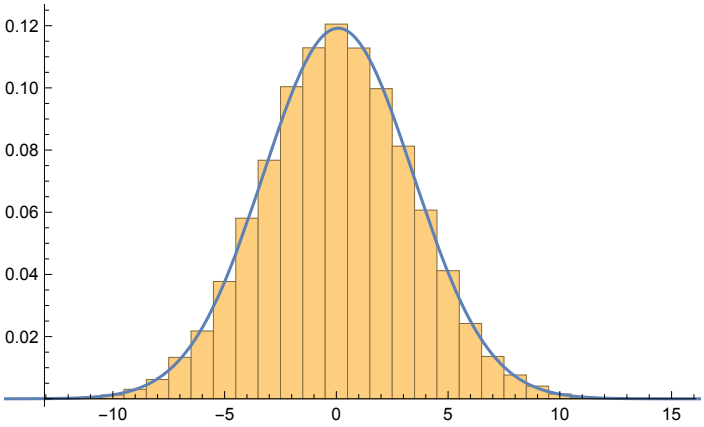
Out[29]=



In[30]:=
```
ypoints = Map[#[[2]] &, points];
yfit = EstimatedDistribution[ypoints, NormalDistribution[mu, sigma]]
Show[Histogram[ypoints, {1}, "PDF"],
 Plot[PDF[yfit, x], {x, -20, 20}, PlotRange → All]]
```

Out[31]=
```
NormalDistribution[0.08585, 3.34758]
```

Out[32]=



In[33]:=
```
fit = EstimatedDistribution[points,
  MultinormalDistribution[{mux, muy}, {{sxx, sxy}, {syx, syy}}]]
Show[Histogram3D[points, {1}, "PDF", ChartBaseStyle → Opacity[0.5]], Plot3D[
  PDF[fit, {x, y}], {x, -20, 20}, {y, -20, 20}, PlotRange → All, PlotPoints → 100]]
```

Out[33]=
```
MultinormalDistribution[{-0.066325, 0.08585},
 {{11.2409, -5.65423}, {-5.65423, 11.2063}}]
```

Out[34]=