In[1]:=
```
(*//first Col.:Star No.
     //Second Col.:Number of shower tracks
    //Third Col.:Number of gray tracks
   //Forth Col.:Number of black tracks
  //Gt,st,bt :numbers of gray,shower,black tracks in all events
   //cgs: correlation between gray and shower tracks
  //ShowerMul:shower multiplicity in each star"*)
(*//Freq_shower,Freq_gray,
Freq_black:frequency of cetain multiplicity (shower,gray,black)
//PT_S1:trasverse momentum of shower track of index
//trasverse momentum calculated by: p_t=p_0*A_f *sin(θ_s);
P_0is the momentum of the incident projectile(=4.5 Gev/c),
A_F is the mass number of the projectile fragment(A_f=28),
θ_s is the emission angle (space angle) of the fragments.
*)
```

In[2]:=

1	2	5	4
2	5	6	8
3	3	6	5
4	11	5	2
5	10	11	1
6	14	6	3
7	4	5	5
8	3	5	4
9	7	14	4
10	1	8	3
11	6	15	3
12	7	10	3
13	6	8	7
14	10	6	3
15	3	11	1
16	1	13	5
17	1	5	4
18	12	6	3
19	0	6	4
20	1	5	2
21	0	13	5
22	1	6	3
23	2	9	5
24	3	10	4
25	1	6	2
26	2	7	4
27	4	9	5
28	7	12	4
29	3	8	2
30	2	9	4
31	3	12	6
32	2	7	3
33	5	12	4
34	6	15	3
35	12	8	2
36	0	8	1
37	14	11	3
38	0	5	1
39	6	9	1
40	1	6	2
41	2	3	3
42	4	9	0
43	3	6	1
44	14	14	1
45	0	5	1

In[3]:= **Multiplicityplates =**

46	7	14	4
47	1	8	1
48	11	16	3
49	7	11	2
50	2	6	4
51	2	3	1
52	4	6	1
53	2	7	0
54	2	8	3
55	2	8	5
56	1	7	1
57	1	11	1
58	1	9	3
59	2	7	2
60	2	5	4
61	3	6	5
62	3	9	2
63	7	16	2
64	2	2	4
65	9	21	3
66	1	5	3
67	4	8	0
68	0	5	0
69	1	5	1
70	4	7	1
71	1	13	1
72	3	2	2
73	7	13	3
74	1	4	1
75	4	4	3
76	4	9	3
77	6	10	5
78	1	4	5
79	2	6	2
80	2	3	3
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82	2	12	2
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85	1	7	2
86	4	4	2
87	7	14	1
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89	3	6	3
90	11	9	2
91	1	7	2
92	10	8	2
93	2	6	3
94	3	5	3
95	3	16	2
96	1	6	1
97	3	7	2
98	2	9	1
99	6	10	4
100	6	12	2
101	3	5	1
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103	3	6	4
104	10	8	2
105	4	13	3
106	2	7	3
107	1	3	3
108	3	7	4
109	9	12	3
110	8	10	4
111	2	5	4
112	4	3	2
113	1	6	2
114	5	6	3
115	3	10	2
116	2	5	2
117	3	7	2
118	8	9	3
119	6	8	3

120	5	10	2
121	12	6	3
122	5	8	1
123	3	9	5
124	3	7	0
125	7	9	1
126	10	6	3
127	11	16	3
128	10	6	3
129	3	7	4
130	16	15	2
131	8	13	4
132	2	5	4
133	7	15	3
134	8	18	2
135	4	7	5
136	3	6	4
137	4	6	1
138	10	21	3
139	5	9	4
140	10	11	1
141	3	9	5
142	13	11	2
143	5	9	1
144	4	10	2
145	6	8	3
146	4	10	2
147	5	10	0
148	7	14	4
149	1	14	3
150	3	6	2
151	2	7	1
152	0	4	1
153	3	9	2
154	5	13	4
155	8	12	3
156	4	11	4
157	9	14	1
158	5	15	2
159	2	9	1
160	4	6	3
161	11	5	2
162	2	4	2
163	12	14	2
164	10	13	4
165	3	12	2
166	2	8	3
167	4	12	2
168	4	7	1

Out[3]= {{1, 2, 5, 4}, {2, 5, 6, 8}, {3, 3, 6, 5}, {4, 11, 5, 2}, {5, 10, 11, 1}, {6, 14, 6, 3},
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In[4]:=
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  {17, 1, 5, 4}, {18, 12, 6, 3}, {19, 0, 6, 4}, {20, 1, 5, 2}, {21, 0, 13, 5},
  {22, 1, 6, 3}, {23, 2, 9, 5}, {24, 3, 10, 4}, {25, 1, 6, 2}, {26, 2, 7, 4}, {27, 4, 9, 5},
  {28, 7, 12, 4}, {29, 3, 8, 2}, {30, 2, 9, 4}, {31, 3, 12, 6}, {32, 2, 7, 3},
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  {67, 4, 8, 0}, {68, 0, 5, 0}, {69, 1, 5, 1}, {70, 4, 7, 1}, {71, 1, 13, 1}, {72, 3, 2, 2},
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In[5]:= **Gt = Table[MultiplicityP12[[j, 3]], {j, 1, 168}]**

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9, 10, 8, 10, 10, 14, 14, 6, 7, 4, 9, 13, 12, 11, 14, 15, 9, 6, 5, 4, 14, 13, 12, 8, 12, 7}

In[6]:=
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Ng = {5, 6, 6, 5, 11, 6, 5, 5, 14, 8, 15, 10, 7, 6, 12, 13, 5, 6, 6, 5, 13, 6, 9, 10, 6, 7, 9, 12,
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Out[6]=
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In[7]:=
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In[8]:=
```
Ns = {2, 5, 3, 11, 10, 14, 4, 3, 7, 1, 6, 7, 6, 10, 3, 1, 1, 12, 0, 1, 0, 1, 2, 3, 1, 2, 4, 7, 3,
  2, 3, 2, 5, 6, 12, 0, 14, 0, 6, 1, 2, 4, 3, 18, 0, 10, 1, 11, 7, 2, 2, 4, 2, 2, 2, 1,
  1, 1, 2, 2, 3, 3, 7, 2, 9, 1, 4, 0, 1, 4, 1, 3, 7, 1, 4, 4, 6, 1, 2, 2, 12, 2, 1, 2, 1,
  4, 7, 1, 3, 11, 1, 10, 2, 3, 3, 1, 3, 2, 6, 5, 3, 2, 2, 10, 4, 2, 1, 3, 9, 7, 2, 4, 1,
  5, 3, 1, 3, 1, 5, 5, 12, 5, 3, 3, 7, 10, 11, 10, 3, 15, 8, 2, 7, 8, 4, 3, 4, 10, 5, 10,
  3, 13, 4, 4, 6, 4, 5, 7, 1, 3, 2, 0, 3, 5, 7, 4, 9, 5, 2, 4, 11, 2, 12, 10, 3, 2, 4, 4}
```

Out[8]=
```
{2, 5, 3, 11, 10, 14, 4, 3, 7, 1, 6, 7, 6, 10, 3, 1, 1, 12, 0, 1, 0, 1, 2, 3, 1, 2, 4, 7, 3,
 2, 3, 2, 5, 6, 12, 0, 14, 0, 6, 1, 2, 4, 3, 18, 0, 10, 1, 11, 7, 2, 2, 4, 2, 2, 2, 1,
 1, 1, 2, 2, 3, 3, 7, 2, 9, 1, 4, 0, 1, 4, 1, 3, 7, 1, 4, 4, 6, 1, 2, 2, 12, 2, 1, 2, 1,
 4, 7, 1, 3, 11, 1, 10, 2, 3, 3, 1, 3, 2, 6, 5, 3, 2, 2, 10, 4, 2, 1, 3, 9, 7, 2, 4, 1,
 5, 3, 1, 3, 1, 5, 5, 12, 5, 3, 3, 7, 10, 11, 10, 3, 15, 8, 2, 7, 8, 4, 3, 4, 10, 5, 10,
 3, 13, 4, 4, 6, 4, 5, 7, 1, 3, 2, 0, 3, 5, 7, 4, 9, 5, 2, 4, 11, 2, 12, 10, 3, 2, 4, 4}
```

In[9]:=
```
Bt = Table[MultiplicityP12[[j, 4]], {j, 1, 168}]
```

Out[9]=
```
{4, 8, 5, 2, 1, 3, 5, 4, 4, 3, 3, 3, 7, 3, 1, 5, 4, 3, 4, 2, 5, 3, 5, 4, 2, 4, 5, 4,
 2, 4, 6, 3, 4, 3, 2, 1, 3, 1, 1, 2, 3, 0, 1, 1, 1, 4, 1, 3, 2, 4, 1, 1, 0, 3, 5, 1,
 1, 3, 2, 4, 5, 2, 2, 4, 3, 3, 0, 0, 1, 1, 1, 2, 3, 1, 3, 3, 5, 5, 2, 3, 1, 2, 3, 2,
 2, 2, 1, 3, 3, 2, 2, 2, 3, 3, 2, 1, 2, 1, 4, 2, 1, 3, 4, 2, 3, 3, 3, 4, 3, 4, 4, 2,
 2, 3, 2, 2, 2, 3, 3, 2, 3, 1, 5, 0, 1, 3, 3, 3, 4, 2, 4, 4, 3, 2, 5, 4, 1, 3, 4, 1,
 5, 2, 1, 2, 3, 2, 0, 4, 3, 2, 1, 1, 2, 4, 3, 4, 1, 2, 1, 3, 2, 2, 2, 4, 2, 3, 2, 1}
```

In[10]:=
```
Nb = {4, 8, 5, 2, 1, 3, 5, 4, 4, 3, 3, 3, 8, 3, 1, 5, 4, 3, 4, 2, 5, 3, 5, 4, 2, 4, 5, 4,
  2, 4, 6, 3, 4, 3, 2, 1, 3, 1, 1, 2, 3, 0, 1, 1, 1, 3, 1, 3, 2, 4, 1, 1, 0, 3, 5, 1,
  1, 3, 2, 4, 5, 2, 2, 4, 3, 3, 0, 0, 1, 1, 1, 2, 3, 1, 3, 3, 5, 5, 2, 3, 1, 2, 3, 2,
  2, 2, 1, 3, 3, 2, 2, 2, 3, 3, 2, 1, 2, 1, 4, 2, 1, 3, 4, 2, 3, 3, 3, 4, 3, 5, 4, 2,
  2, 3, 2, 2, 4, 3, 3, 2, 3, 1, 5, 0, 1, 3, 3, 3, 4, 2, 4, 4, 3, 2, 5, 4, 1, 3, 4, 1,
  5, 2, 0, 2, 3, 2, 0, 4, 3, 2, 1, 1, 2, 4, 4, 6, 1, 2, 1, 3, 2, 2, 2, 4, 2, 3, 2, 1}
```

Out[10]=
```
{4, 8, 5, 2, 1, 3, 5, 4, 4, 3, 3, 3, 8, 3, 1, 5, 4, 3, 4, 2, 5, 3, 5, 4, 2, 4, 5, 4,
 2, 4, 6, 3, 4, 3, 2, 1, 3, 1, 1, 2, 3, 0, 1, 1, 1, 3, 1, 3, 2, 4, 1, 1, 0, 3, 5, 1,
 1, 3, 2, 4, 5, 2, 2, 4, 3, 3, 0, 0, 1, 1, 1, 2, 3, 1, 3, 3, 5, 5, 2, 3, 1, 2, 3, 2,
 2, 2, 1, 3, 3, 2, 2, 2, 3, 3, 2, 1, 2, 1, 4, 2, 1, 3, 4, 2, 3, 3, 3, 4, 3, 5, 4, 2,
 2, 3, 2, 2, 4, 3, 3, 2, 3, 1, 5, 0, 1, 3, 3, 3, 4, 2, 4, 4, 3, 2, 5, 4, 1, 3, 4, 1,
 5, 2, 0, 2, 3, 2, 0, 4, 3, 2, 1, 1, 2, 4, 4, 6, 1, 2, 1, 3, 2, 2, 2, 4, 2, 3, 2, 1}
```

In[11]:=
```
cgs = Table[MultiplicityP12[[j, i]], {j, 1, 168}, {i, 2, 3}]
```

Out[11]=
```
{{2, 5}, {5, 6}, {3, 6}, {11, 5}, {10, 11}, {14, 6}, {4, 5}, {3, 5}, {7, 14}, {1, 8},
 {6, 15}, {7, 10}, {6, 8}, {10, 6}, {3, 11}, {1, 13}, {1, 5}, {12, 6}, {0, 6}, {1, 5},
 {0, 13}, {1, 6}, {2, 9}, {3, 10}, {1, 6}, {2, 7}, {4, 9}, {7, 12}, {3, 8}, {2, 9},
 {3, 12}, {2, 7}, {5, 12}, {6, 15}, {12, 8}, {0, 8}, {14, 11}, {0, 5}, {6, 9}, {1, 6},
 {2, 3}, {4, 9}, {3, 6}, {14, 14}, {0, 5}, {7, 14}, {1, 8}, {11, 16}, {7, 11}, {2, 6},
 {2, 3}, {4, 6}, {2, 7}, {2, 8}, {2, 8}, {1, 7}, {1, 11}, {1, 9}, {2, 7}, {2, 5},
 {3, 6}, {3, 9}, {7, 16}, {2, 2}, {9, 21}, {1, 5}, {4, 8}, {0, 5}, {1, 5}, {4, 7},
 {1, 13}, {3, 2}, {7, 13}, {1, 4}, {4, 4}, {4, 9}, {6, 10}, {1, 4}, {2, 6}, {2, 3},
 {12, 14}, {2, 12}, {1, 8}, {2, 5}, {1, 7}, {4, 4}, {7, 14}, {1, 8}, {3, 6}, {11, 9},
 {1, 7}, {10, 8}, {2, 6}, {3, 5}, {3, 16}, {1, 6}, {3, 7}, {2, 9}, {6, 10}, {6, 12},
 {3, 5}, {4, 8}, {3, 6}, {10, 8}, {4, 13}, {2, 7}, {1, 3}, {3, 7}, {9, 12}, {8, 10},
 {2, 5}, {4, 3}, {1, 6}, {5, 6}, {3, 10}, {2, 5}, {3, 7}, {8, 9}, {6, 8}, {5, 10},
 {12, 6}, {5, 8}, {3, 9}, {3, 7}, {7, 9}, {10, 6}, {11, 16}, {10, 6}, {3, 7}, {16, 15},
 {8, 13}, {2, 5}, {7, 15}, {8, 18}, {4, 7}, {3, 6}, {4, 6}, {10, 21}, {5, 9}, {10, 11},
 {3, 9}, {13, 11}, {5, 9}, {4, 10}, {6, 8}, {4, 10}, {5, 10}, {7, 14}, {1, 14},
 {3, 6}, {2, 7}, {0, 4}, {3, 9}, {5, 13}, {8, 12}, {4, 11}, {9, 14}, {5, 15}, {2, 9},
 {4, 6}, {11, 5}, {2, 4}, {12, 14}, {10, 13}, {3, 12}, {2, 8}, {4, 12}, {4, 7}}
```

In[12]:=
```
CorrGS = {{5, 2}, {6, 5}, {6, 3}, {5, 11}, {11, 10}, {6, 14}, {5, 4}, {5, 3}, {14, 7}, {8, 1},
  {15, 6}, {10, 7}, {7, 6}, {6, 10}, {12, 3}, {13, 1}, {5, 1}, {6, 12}, {6, 0}, {5, 1},
  {13, 0}, {6, 1}, {9, 2}, {10, 3}, {6, 1}, {7, 2}, {9, 4}, {12, 7}, {8, 3}, {9, 2},
  {12, 3}, {7, 2}, {12, 5}, {15, 6}, {8, 12}, {8, 0}, {11, 14}, {5, 0}, {9, 6}, {6, 1},
  {3, 2}, {9, 4}, {9, 3}, {11, 18}, {5, 0}, {18, 10}, {8, 1}, {16, 11}, {11, 7},
  {6, 2}, {3, 2}, {6, 4}, {7, 2}, {8, 2}, {8, 2}, {7, 1}, {11, 1}, {9, 1}, {7, 2},
  {5, 2}, {6, 3}, {9, 3}, {16, 7}, {2, 2}, {21, 9}, {5, 1}, {8, 4}, {5, 0}, {5, 1},
  {7, 4}, {13, 1}, {2, 3}, {13, 7}, {4, 1}, {4, 4}, {9, 4}, {10, 6}, {4, 1}, {6, 2},
  {3, 2}, {14, 12}, {12, 2}, {8, 1}, {5, 2}, {7, 1}, {4, 4}, {14, 7}, {8, 1}, {6, 3},
  {9, 11}, {7, 1}, {8, 10}, {6, 2}, {5, 3}, {16, 3}, {6, 1}, {7, 3}, {9, 2}, {10, 6},
  {12, 5}, {5, 3}, {8, 2}, {2, 2}, {8, 10}, {13, 4}, {7, 2}, {3, 1}, {7, 3}, {12, 9},
  {10, 7}, {5, 2}, {3, 4}, {6, 1}, {6, 5}, {9, 3}, {5, 1}, {7, 3}, {9, 1}, {8, 5},
  {10, 5}, {6, 12}, {8, 5}, {9, 3}, {7, 3}, {9, 7}, {6, 10}, {16, 11}, {6, 10}, {7, 3},
  {14, 15}, {13, 8}, {5, 2}, {15, 7}, {18, 8}, {7, 4}, {6, 3}, {5, 4}, {21, 10}, {9, 5},
  {11, 10}, {9, 3}, {11, 13}, {9, 4}, {10, 4}, {8, 6}, {10, 4}, {10, 5}, {14, 7},
  {13, 1}, {6, 3}, {7, 2}, {4, 0}, {9, 3}, {13, 5}, {12, 7}, {11, 4}, {14, 9}, {15, 5},
  {9, 2}, {6, 4}, {5, 11}, {4, 2}, {14, 12}, {13, 10}, {12, 3}, {8, 2}, {12, 4}, {7, 4}}
```

Out[12]=
```
{{5, 2}, {6, 5}, {6, 3}, {5, 11}, {11, 10}, {6, 14}, {5, 4}, {5, 3}, {14, 7}, {8, 1},
 {15, 6}, {10, 7}, {7, 6}, {6, 10}, {12, 3}, {13, 1}, {5, 1}, {6, 12}, {6, 0}, {5, 1},
 {13, 0}, {6, 1}, {9, 2}, {10, 3}, {6, 1}, {7, 2}, {9, 4}, {12, 7}, {8, 3}, {9, 2},
 {12, 3}, {7, 2}, {12, 5}, {15, 6}, {8, 12}, {8, 0}, {11, 14}, {5, 0}, {9, 6}, {6, 1},
 {3, 2}, {9, 4}, {9, 3}, {11, 18}, {5, 0}, {18, 10}, {8, 1}, {16, 11}, {11, 7},
 {6, 2}, {3, 2}, {6, 4}, {7, 2}, {8, 2}, {8, 2}, {7, 1}, {11, 1}, {9, 1}, {7, 2},
 {5, 2}, {6, 3}, {9, 3}, {16, 7}, {2, 2}, {21, 9}, {5, 1}, {8, 4}, {5, 0}, {5, 1},
 {7, 4}, {13, 1}, {2, 3}, {13, 7}, {4, 1}, {4, 4}, {9, 4}, {10, 6}, {4, 1}, {6, 2},
 {3, 2}, {14, 12}, {12, 2}, {8, 1}, {5, 2}, {7, 1}, {4, 4}, {14, 7}, {8, 1}, {6, 3},
 {9, 11}, {7, 1}, {8, 10}, {6, 2}, {5, 3}, {16, 3}, {6, 1}, {7, 3}, {9, 2}, {10, 6},
 {12, 5}, {5, 3}, {8, 2}, {2, 2}, {8, 10}, {13, 4}, {7, 2}, {3, 1}, {7, 3}, {12, 9},
 {10, 7}, {5, 2}, {3, 4}, {6, 1}, {6, 5}, {9, 3}, {5, 1}, {7, 3}, {9, 1}, {8, 5},
 {10, 5}, {6, 12}, {8, 5}, {9, 3}, {7, 3}, {9, 7}, {6, 10}, {16, 11}, {6, 10}, {7, 3},
 {14, 15}, {13, 8}, {5, 2}, {15, 7}, {18, 8}, {7, 4}, {6, 3}, {5, 4}, {21, 10}, {9, 5},
 {11, 10}, {9, 3}, {11, 13}, {9, 4}, {10, 4}, {8, 6}, {10, 4}, {10, 5}, {14, 7},
 {13, 1}, {6, 3}, {7, 2}, {4, 0}, {9, 3}, {13, 5}, {12, 7}, {11, 4}, {14, 9}, {15, 5},
 {9, 2}, {6, 4}, {5, 11}, {4, 2}, {14, 12}, {13, 10}, {12, 3}, {8, 2}, {12, 4}, {7, 4}}
```

In[13]:= **BinCounts[CorrGS]**

Out[13]=
```
{{0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 2, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 1, 3, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 1, 2, 1, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 3, 5, 5, 3, 2, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0},
 {0, 1, 5, 3, 5, 2, 2, 0, 0, 0, 0, 3, 0, 2, 0, 1, 0, 0, 0, 0},
 {0, 0, 3, 6, 5, 3, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 1, 4, 4, 1, 1, 2, 1, 0, 0, 0, 2, 0, 1, 0, 0, 0, 0, 0, 0},
 {0, 0, 2, 4, 6, 4, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 1, 2, 2, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 2, 0, 0, 1, 1, 0, 0, 0, 1},
 {0, 0, 0, 1, 3, 1, 2, 0, 2, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 1, 3, 0, 0, 1, 1, 0, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 0, 0, 3, 0, 1, 0, 0, 2, 0, 0, 1, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 1, 2, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0}}
```

In[14]:= **BinLists[CorrGS]**

Out[14]= {{{}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {}, {{2, 2}, {2, 2}}, {{2, 3}}, {}, {}, {}, {}, {}, {}, {}, {},
{}, {}, {}, {}, {}, {}, {}}, {{}, {}, {{3, 1}}, {{3, 2}, {3, 2}, {3, 2}},
{}, {{3, 4}}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {{4, 0}}, {{4, 1}, {4, 1}}, {{4, 2}}, {}, {{4, 4}, {4, 4}},
{}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {{5, 0}, {5, 0}, {5, 0}}, {{5, 1}, {5, 1}, {5, 1}, {5, 1}, {5, 1}},
{{5, 2}, {5, 2}, {5, 2}, {5, 2}, {5, 2}}, {{5, 3}, {5, 3}, {5, 3}}, {{5, 4}, {5, 4}},
{}, {}, {}, {}, {}, {}, {{5, 11}, {5, 11}}, {}, {}, {}, {}, {}, {}, {}},
{{}, {{6, 0}}, {{6, 1}, {6, 1}, {6, 1}, {6, 1}, {6, 1}}, {{6, 2}, {6, 2}, {6, 2}},
{{6, 3}, {6, 3}, {6, 3}, {6, 3}, {6, 3}}, {{6, 4}, {6, 4}}, {{6, 5}, {6, 5}}, {}, {}, {},
{}, {{6, 10}, {6, 10}, {6, 10}}, {}, {{6, 12}, {6, 12}}, {}, {{6, 14}}, {}, {}, {}, {}},
{{}, {}, {{7, 1}, {7, 1}, {7, 1}}, {{7, 2}, {7, 2}, {7, 2}, {7, 2}, {7, 2}, {7, 2}},
{{7, 3}, {7, 3}, {7, 3}, {7, 3}, {7, 3}}, {{7, 4}, {7, 4}, {7, 4}},
{}, {{7, 6}}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {{8, 0}}, {{8, 1}, {8, 1}, {8, 1}, {8, 1}}, {{8, 2}, {8, 2}, {8, 2}, {8, 2}},
{{8, 3}}, {{8, 4}}, {{8, 5}, {8, 5}}, {{8, 6}}, {}, {}, {},
{{8, 10}, {8, 10}}, {}, {{8, 12}}, {}, {}, {}, {}, {}, {}},
{{}, {}, {{9, 1}, {9, 1}}, {{9, 2}, {9, 2}, {9, 2}, {9, 2}},
{{9, 3}, {9, 3}, {9, 3}, {9, 3}, {9, 3}, {9, 3}}, {{9, 4}, {9, 4}, {9, 4}, {9, 4}},
{{9, 5}}, {{9, 6}}, {{9, 7}}, {}, {}, {}, {{9, 11}}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {}, {}, {{10, 3}}, {{10, 4}, {10, 4}}, {{10, 5}, {10, 5}},
{{10, 6}, {10, 6}}, {{10, 7}, {10, 7}}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {{11, 1}}, {}, {}, {{11, 4}}, {}, {}, {{11, 7}}, {}, {},
{{11, 10}, {11, 10}}, {}, {}, {{11, 13}}, {{11, 14}}, {}, {}, {}, {{11, 18}}},
{{}, {}, {}, {{12, 2}}, {{12, 3}, {12, 3}, {12, 3}}, {{12, 4}}, {{12, 5}, {12, 5}},
{}, {{12, 7}, {12, 7}}, {}, {{12, 9}}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {{13, 0}}, {{13, 1}, {13, 1}, {13, 1}}, {}, {}, {{13, 4}}, {{13, 5}},
{}, {{13, 7}}, {{13, 8}}, {}, {{13, 10}}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {}, {}, {}, {}, {}, {}, {{14, 7}, {14, 7}, {14, 7}}, {}, {{14, 9}},
{}, {}, {{14, 12}, {14, 12}}, {}, {}, {{14, 15}}, {}, {}, {}},
{{}, {}, {}, {}, {}, {}, {{15, 5}}, {{15, 6}, {15, 6}}, {{15, 7}}, {}, {},
{}, {}, {}, {}, {}, {}, {}, {}, {}}, {{}, {}, {}, {}, {{16, 3}}, {}, {}, {},
{{16, 7}}, {}, {}, {}, {{16, 11}, {16, 11}}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {}, {}, {}, {}, {}, {}, {}, {{18, 8}}, {}, {{18, 10}}, {}, {}, {}, {}, {}, {}, {},
{}}, {{}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}},
{{}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}, {}}, {{},
{}, {}, {}, {}, {}, {}, {}, {}, {}, {{21, 9}}, {{21, 10}}, {}, {}, {}, {}, {}, {}, {}, {}}}

In[15]:= **graydistribution = BinCounts[Gt, {min = 2, max = 22, interval = 1}]**

Out[15]= {2, 5, 6, 19, 27, 17, 18, 18, 10, 8, 9, 8, 9, 5, 4, 0, 1, 0, 0, 2}

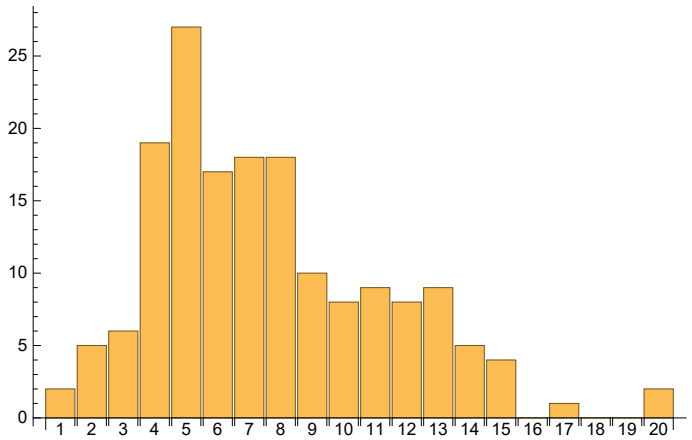
In[16]:= **{3, 5, 6, 20, 24, 18, 17, 20, 9, 8, 10, 9, 7, 4, 4, 0, 2, 0, 0, 2}**

Out[16]= {3, 5, 6, 20, 24, 18, 17, 20, 9, 8, 10, 9, 7, 4, 4, 0, 2, 0, 0, 2}

In[17]:=

```
FG = BarChart[graydistribution, ChartLabels → Range[22]]
```

Out[17]=



In[18]:=

```
PDF[PDF[PoissonDistribution[6.607142857142858`], x]]
```

Out[18]=

$$\text{PDF}\left[\begin{cases} \frac{0.00135069 \times 6.60714^{x}}{x!} & x \geq 0 \\ 0 & \text{True} \end{cases}\right]$$

In[19]:=

```
gf = 0.0036715445132779194` × 6.607142857142858`^x / x!
```

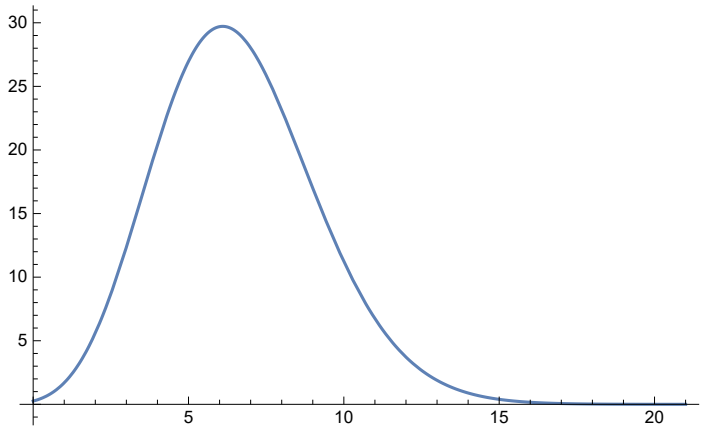
Out[19]=

$$\frac{0.00367154 \times 6.60714^{x}}{x!}$$

In[20]:=

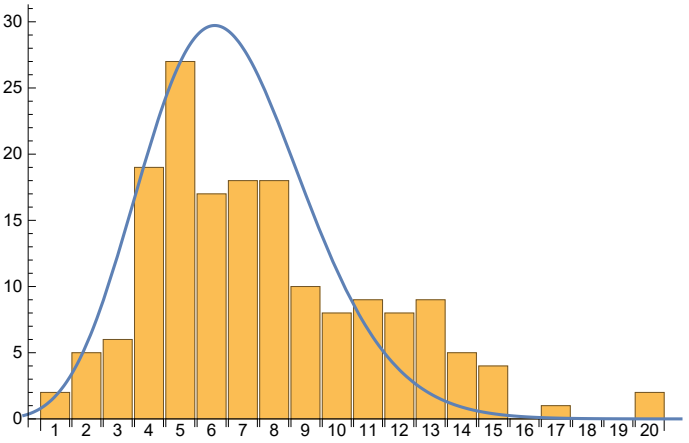
```
GM = Plot[70 * gf, {x, 0, 21}]
```

Out[20]=



In[21]:=
```
Show[FG, GM]
```

Out[21]=



In[22]:=
```
showerdistribution = BinCounts[Ns, {0, 19, 1}]
```

Out[22]=
```
{7, 26, 29, 26, 20, 11, 7, 12, 2, 3, 10, 5, 5, 1, 2, 1, 0, 0, 1}
```

In[23]:=
```
{7, 26, 29, 26, 20, 11, 7, 12, 2, 3, 10, 5, 5, 1, 2, 1, 0, 0, 1}
```

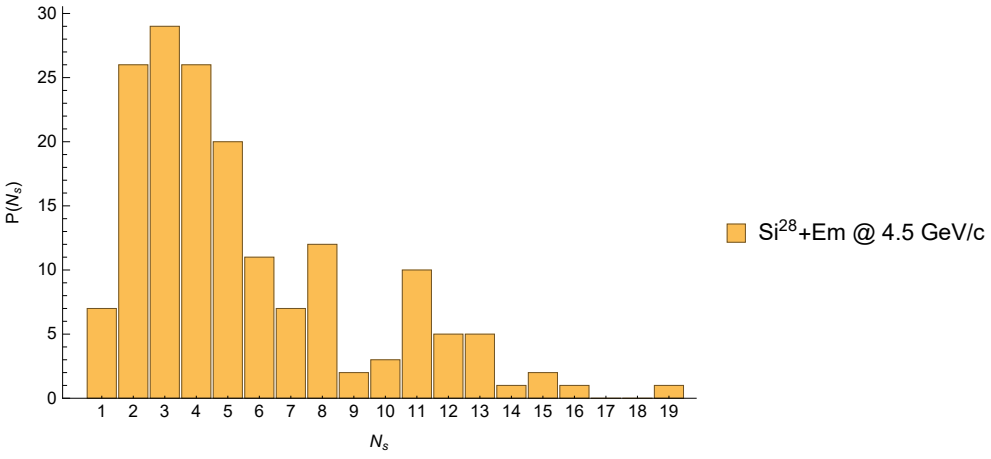
Out[23]=
```
{7, 26, 29, 26, 20, 11, 7, 12, 2, 3, 10, 5, 5, 1, 2, 1, 0, 0, 1}
```

In[24]:=
```
BinLists[Ns, {0, 19, 1}]
```

Out[24]=
```
{{0, 0, 0, 0, 0, 0, 0},
 {1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1},
 {2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2},
 {3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3},
 {4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4},
 {5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5}, {6, 6, 6, 6, 6, 6, 6},
 {7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7}, {8, 8}, {9, 9, 9},
 {10, 10, 10, 10, 10, 10, 10, 10, 10, 10}, {11, 11, 11, 11, 11},
 {12, 12, 12, 12, 12}, {13}, {14, 14}, {15}, {}, {}, {18}}
```

In[25]:=
```
SM = BarChart[showerdistribution, Frame → {{True, False}, {True, False}},
  FrameLabel → {"Ns", "P(Ns)"} , ChartLabels → Range[20],
  ChartLegends → Placed[{"Si28+Em @ 4.5 GeV/c"}, Right]]
```

Out[25]=



In[26]:=
```
Table[MultiplicityP12[[j, i]], {j, 1, 168}, {i, 1, 2}]
```

Out[26]=
```
{{1, 2}, {2, 5}, {3, 3}, {4, 11}, {5, 10}, {6, 14}, {7, 4}, {8, 3}, {9, 7}, {10, 1}, {11, 6},
 {12, 7}, {13, 6}, {14, 10}, {15, 3}, {16, 1}, {17, 1}, {18, 12}, {19, 0}, {20, 1},
 {21, 0}, {22, 1}, {23, 2}, {24, 3}, {25, 1}, {26, 2}, {27, 4}, {28, 7}, {29, 3}, {30, 2},
 {31, 3}, {32, 2}, {33, 5}, {34, 6}, {35, 12}, {36, 0}, {37, 14}, {38, 0}, {39, 6},
 {40, 1}, {41, 2}, {42, 4}, {43, 3}, {44, 14}, {45, 0}, {46, 7}, {47, 1}, {48, 11},
 {49, 7}, {50, 2}, {51, 2}, {52, 4}, {53, 2}, {54, 2}, {55, 2}, {56, 1}, {57, 1}, {58, 1},
 {59, 2}, {60, 2}, {61, 3}, {62, 3}, {63, 7}, {64, 2}, {65, 9}, {66, 1}, {67, 4},
 {68, 0}, {69, 1}, {70, 4}, {71, 1}, {72, 3}, {73, 7}, {74, 1}, {75, 4}, {76, 4},
 {77, 6}, {78, 1}, {79, 2}, {80, 2}, {81, 12}, {82, 2}, {83, 1}, {84, 2}, {85, 1},
 {86, 4}, {87, 7}, {88, 1}, {89, 3}, {90, 11}, {91, 1}, {92, 10}, {93, 2}, {94, 3},
 {95, 3}, {96, 1}, {97, 3}, {98, 2}, {99, 6}, {100, 6}, {101, 3}, {102, 4}, {103, 3},
 {104, 10}, {105, 4}, {106, 2}, {107, 1}, {108, 3}, {109, 9}, {110, 8}, {111, 2},
 {112, 4}, {113, 1}, {114, 5}, {115, 3}, {116, 2}, {117, 3}, {118, 8}, {119, 6},
 {120, 5}, {121, 12}, {122, 5}, {123, 3}, {124, 3}, {125, 7}, {126, 10}, {127, 11},
 {128, 10}, {129, 3}, {130, 16}, {131, 8}, {132, 2}, {133, 7}, {134, 8}, {135, 4},
 {136, 3}, {137, 4}, {138, 10}, {139, 5}, {140, 10}, {141, 3}, {142, 13}, {143, 5},
 {144, 4}, {145, 6}, {146, 4}, {147, 5}, {148, 7}, {149, 1}, {150, 3}, {151, 2}, {152, 0},
 {153, 3}, {154, 5}, {155, 8}, {156, 4}, {157, 9}, {158, 5}, {159, 2}, {160, 4},
 {161, 11}, {162, 2}, {163, 12}, {164, 10}, {165, 3}, {166, 2}, {167, 4}, {168, 4}}
```

In[27]:=
```
ShowerMul = {{1, 5}, {2, 6}, {3, 6}, {4, 5}, {5, 11}, {6, 6}, {7, 5}, {8, 5}, {9, 14},
  {10, 8}, {11, 15}, {12, 10}, {13, 7}, {14, 6}, {15, 12}, {16, 13}, {17, 5},
  {18, 6}, {19, 6}, {20, 5}, {21, 13}, {22, 6}, {23, 9}, {24, 10}, {25, 6}, {26, 7},
  {27, 9}, {28, 12}, {29, 8}, {30, 9}, {31, 12}, {32, 7}, {33, 12}, {34, 15},
  {35, 8}, {36, 8}, {37, 11}, {38, 5}, {39, 9}, {40, 6}, {41, 3}, {42, 9}, {43, 9},
  {44, 11}, {45, 5}, {46, 18}, {47, 8}, {48, 16}, {49, 11}, {50, 6}, {51, 3}, {52, 6},
  {53, 7}, {54, 8}, {55, 8}, {56, 7}, {57, 11}, {58, 9}, {59, 7}, {60, 5}, {61, 6},
  {62, 9}, {63, 16}, {64, 2}, {65, 21}, {66, 5}, {67, 8}, {68, 5}, {69, 5}, {70, 7},
  {71, 13}, {72, 2}, {73, 13}, {74, 4}, {75, 4}, {76, 9}, {77, 10}, {78, 4}, {79, 6},
  {80, 3}, {81, 14}, {82, 12}, {83, 8}, {84, 5}, {85, 7}, {86, 4}, {87, 14}, {88, 8},
  {89, 6}, {90, 9}, {91, 7}, {92, 8}, {93, 6}, {94, 5}, {95, 16}, {96, 6}, {97, 7},
  {98, 9}, {99, 10}, {100, 12}, {101, 5}, {102, 8}, {103, 2}, {104, 8}, {105, 13},
  {106, 7}, {107, 3}, {108, 7}, {109, 12}, {110, 10}, {111, 5}, {112, 3}, {113, 6},
  {114, 6}, {115, 9}, {116, 5}, {117, 7}, {118, 9}, {119, 8}, {120, 10}, {121, 6},
  {122, 8}, {123, 9}, {124, 7}, {125, 9}, {126, 6}, {127, 16}, {128, 6}, {129, 7},
  {130, 14}, {131, 13}, {132, 5}, {133, 15}, {134, 18}, {135, 7}, {136, 6}, {137, 5},
  {138, 21}, {139, 9}, {140, 11}, {141, 9}, {142, 11}, {143, 9}, {144, 10}, {145, 8},
  {146, 10}, {147, 10}, {148, 14}, {149, 13}, {150, 6}, {151, 7}, {152, 4}, {153, 9},
  {154, 13}, {155, 12}, {156, 11}, {157, 14}, {158, 15}, {159, 9}, {160, 6},
  {161, 5}, {162, 4}, {163, 14}, {164, 13}, {165, 12}, {166, 8}, {167, 12}, {168, 7}}
```

Out[27]=
```
{{1, 5}, {2, 6}, {3, 6}, {4, 5}, {5, 11}, {6, 6}, {7, 5}, {8, 5}, {9, 14}, {10, 8}, {11, 15},
 {12, 10}, {13, 7}, {14, 6}, {15, 12}, {16, 13}, {17, 5}, {18, 6}, {19, 6}, {20, 5},
 {21, 13}, {22, 6}, {23, 9}, {24, 10}, {25, 6}, {26, 7}, {27, 9}, {28, 12}, {29, 8},
 {30, 9}, {31, 12}, {32, 7}, {33, 12}, {34, 15}, {35, 8}, {36, 8}, {37, 11}, {38, 5},
 {39, 9}, {40, 6}, {41, 3}, {42, 9}, {43, 9}, {44, 11}, {45, 5}, {46, 18}, {47, 8},
 {48, 16}, {49, 11}, {50, 6}, {51, 3}, {52, 6}, {53, 7}, {54, 8}, {55, 8}, {56, 7},
 {57, 11}, {58, 9}, {59, 7}, {60, 5}, {61, 6}, {62, 9}, {63, 16}, {64, 2}, {65, 21},
 {66, 5}, {67, 8}, {68, 5}, {69, 5}, {70, 7}, {71, 13}, {72, 2}, {73, 13}, {74, 4},
 {75, 4}, {76, 9}, {77, 10}, {78, 4}, {79, 6}, {80, 3}, {81, 14}, {82, 12}, {83, 8},
 {84, 5}, {85, 7}, {86, 4}, {87, 14}, {88, 8}, {89, 6}, {90, 9}, {91, 7}, {92, 8}, {93, 6},
 {94, 5}, {95, 16}, {96, 6}, {97, 7}, {98, 9}, {99, 10}, {100, 12}, {101, 5}, {102, 8},
 {103, 2}, {104, 8}, {105, 13}, {106, 7}, {107, 3}, {108, 7}, {109, 12}, {110, 10},
 {111, 5}, {112, 3}, {113, 6}, {114, 6}, {115, 9}, {116, 5}, {117, 7}, {118, 9}, {119, 8},
 {120, 10}, {121, 6}, {122, 8}, {123, 9}, {124, 7}, {125, 9}, {126, 6}, {127, 16}, {128, 6},
 {129, 7}, {130, 14}, {131, 13}, {132, 5}, {133, 15}, {134, 18}, {135, 7}, {136, 6},
 {137, 5}, {138, 21}, {139, 9}, {140, 11}, {141, 9}, {142, 11}, {143, 9}, {144, 10},
 {145, 8}, {146, 10}, {147, 10}, {148, 14}, {149, 13}, {150, 6}, {151, 7}, {152, 4},
 {153, 9}, {154, 13}, {155, 12}, {156, 11}, {157, 14}, {158, 15}, {159, 9}, {160, 6},
 {161, 5}, {162, 4}, {163, 14}, {164, 13}, {165, 12}, {166, 8}, {167, 12}, {168, 7}}
```

In[28]:=
```
Mean [ShowerMul] // N
```

Out[28]=
```
{84.5, 8.60714}
```

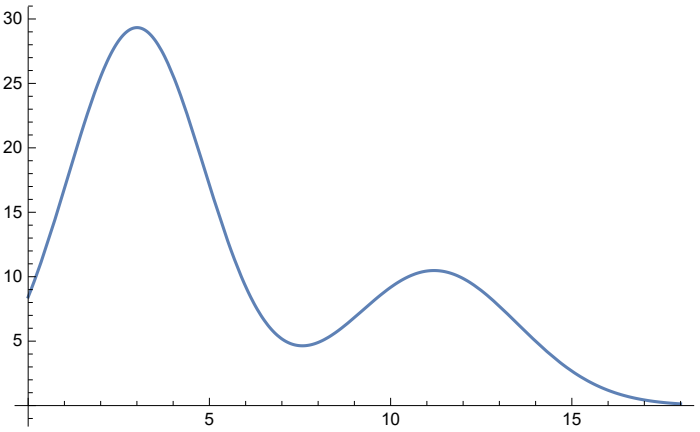
In[29]:=
```
StandardDeviation[ShowerMul] // N
```

Out[29]=
```
{48.6415, 3.72407}
```

In[30]:=
```
f1 = MixtureDistribution[{8.607142857142858`, 3.7240691708197997`},
    {NormalDistribution[3, 1.9], NormalDistribution[11.2, 2.3]}];
```

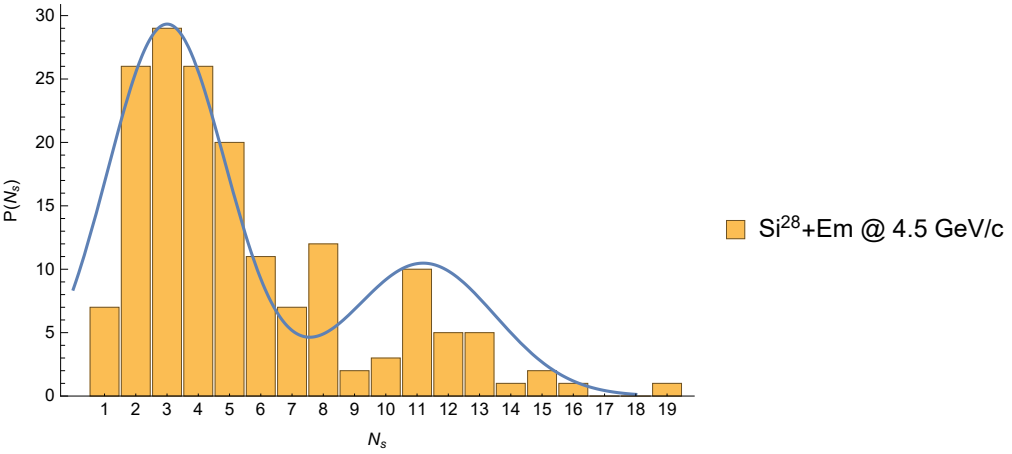
In[31]:=
```
y = Plot[200 * PDF[f1, x], {x, 0, 18}]
```

Out[31]=



In[32]:=
```
Show[SM, y]
```

Out[32]=



In[33]:=
```
FindFit[showerdistribution,
  {A e^-((x-μ)^2/(2σ)) + A1 e^-((x-μ1)^2/(2σ1)) + A2 e^-((x-μ2)^2/(2σ2))}, {A, A1, A2, μ, σ, μ1, σ1, μ2, σ2}, x]
```

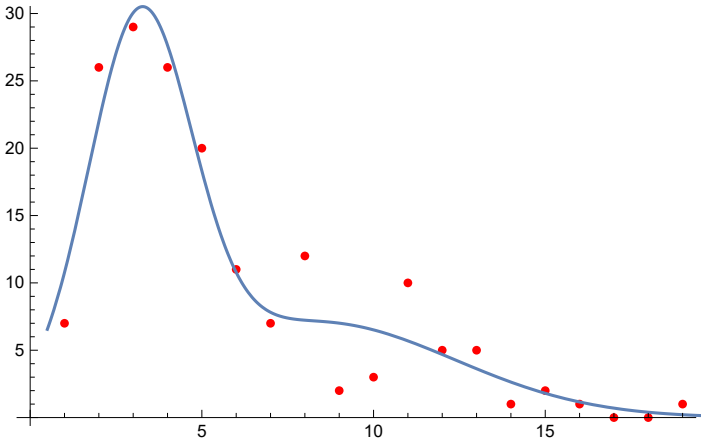
FindFit::sszero :

The step size in the search has become less than the tolerance prescribed by the PrecisionGoal option, but the gradient is larger than the tolerance specified by the AccuracyGoal option. There is a possibility that the method has stalled at a point that is not a local minimum. >>

Out[33]=
```
{A → -0.941032, A1 → 7.0893, A2 → 27.3426, μ → -85.0412,
 σ → 35.451, μ1 → 8.33886, σ1 → 16.184, μ2 → 3.19409, σ2 → 2.26053}
```

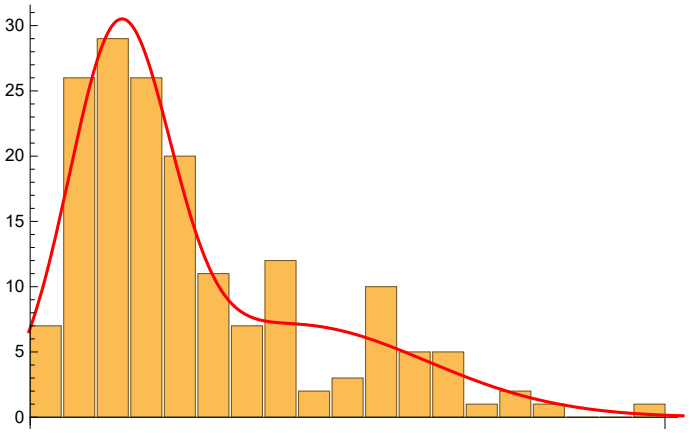
In[34]:=
```
Show[ListPlot[showerdistribution, PlotStyle → Red],
 Plot[{A e^-((x-μ)^2/(2 σ)) + A1 e^-((x-μ1)^2/(2 σ1)) + A2 e^-((x-μ2)^2/(2 σ2))} /.
   {A → -0.941032, A1 → 7.0893, A2 → 27.3426, μ → -85.0412, σ → 35.451,
    μ1 → 8.33886, σ1 → 16.184, μ2 → 3.19409, σ2 → 2.26053}, {x, 0.5, 20}]]
```

Out[34]=



In[35]:=
```
Show[BarChart[showerdistribution, PlotRange → {{0.5, 20}, {0, 30}},
  FrameStyle → Directive[GrayLevel[0], AbsoluteThickness[2.]],
  FrameTicksStyle → Directive[Bold, Dashed, 12]], Plot[{A e^-((x-μ)^2/(2 σ)) + A1 e^-((x-μ1)^2/(2 σ1)) + A2 e^-((x-μ2)^2/(2 σ2))} /.
   {A → -0.941032, A1 → 7.0893, A2 → 27.3426, μ → -85.0412, σ → 35.451, μ1 → 8.33886,
    σ1 → 16.184, μ2 → 3.19409, σ2 → 2.26053}, {x, 0.5, 20}, PlotStyle → Red]]
```

Out[35]=

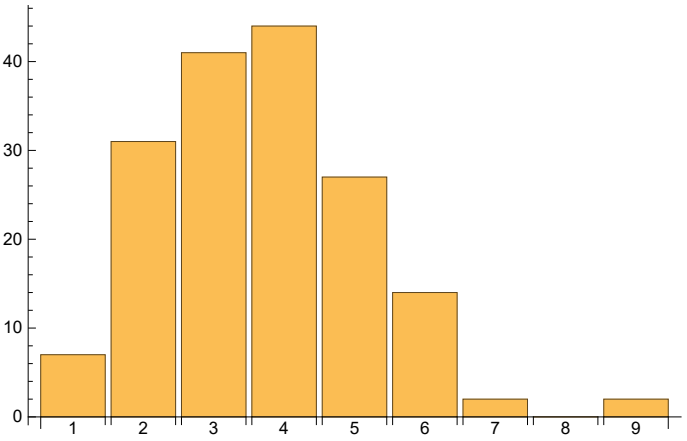


In[36]:=
```
blackdistribution = BinCounts[Nb, {0, 9, 1}]
```

Out[36]=
```
{7, 31, 41, 44, 27, 14, 2, 0, 2}
```

In[37]:=
```
BM = BarChart[blackdistribution, ChartLabels → Range[10]]
```

Out[37]=



In[38]:=
```
Mean [Nb] // N
```

Out[38]= 2.68452

In[39]:=
```
StandardDeviation[Nb] // N
```

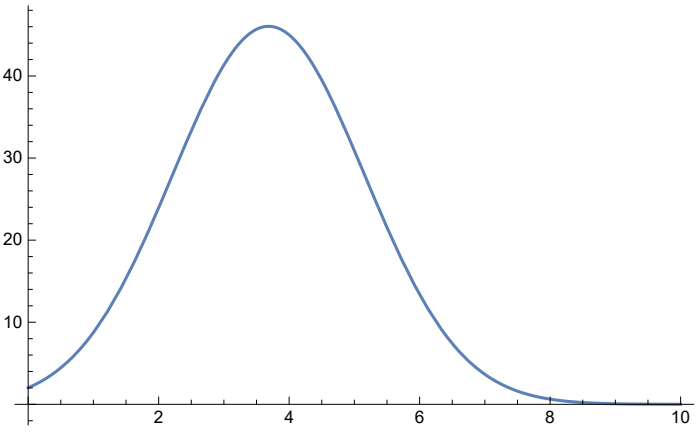
Out[39]= 1.47287

In[40]:=
```
PDF[NormalDistribution[2.6845238095238093`, 1.4728679138487881`], b]
```

Out[40]= $0.270861\, e^{-0.230485\ (-2.68452+b)^2}$

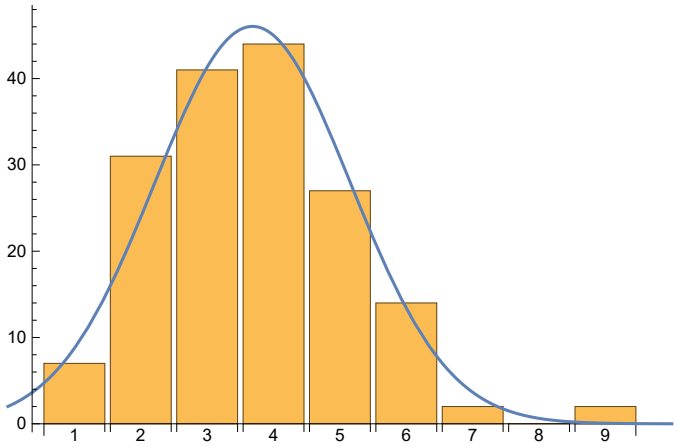
In[41]:=
```
Z = Plot[
  170 * PDF[NormalDistribution[3.6845238095238093`, 1.4728679138487881`], x], {x, 0, 10}]
```

Out[41]=



In[42]:=
```
Show[BM, Z]
```

Out[42]=



In[43]:=
```
(*///////star_index  ## shower_multiplicity##
      Space_angles##pasudo_rapidity##transverse_momentum////////*)
```

In[44]:=
```
d = {{star_index = 1, No_ofshower = 2, spaceangle_S1 = 178.77892,
   spaceangle_S2 = 270.9107, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   pasudo_S1 = -4.5416, pasudo_S2 = 0.015895, PT_S1 = 36.25464, PT_S2 = 84.37537},
  {2, 4, 89.07474, 89.32834, 270.57248, 90.29786, 0.477864, 0.208546,
   1.607566, -0.84931, 112.8662, 123.3088, 48.54535, 91.11471},
  {3, 2, 180.7596, 271.62649, -5.01632, 0.028391, -125.123, 125.0746},
  {4, 11, 87.49887, 274.06372, 268.31745, 267.2888, 180.78075, 180.94066, 181.8309,
   177.59474, 177.35547, 91.81836, 91.87356, 0.043666824, 0.070984833, -0.029370259,
   -0.047337036, -4.988858954, -4.802525206, -4.136481397, -3.863569267,
   -3.768703238, -0.031741698, -0.03270562, -56.5828, -85.4392, -120.785, -31.5908,
   -124.782, -120.407, -46.9084, 125.4348, 124.6866, -82.3385, -87.4751},
  {5, 10, 4.5794, 0.86966, 295.6847, 276.13935, 274.06372, 271.43157,
   270.3407, 268.31745, 267.2888, 179.24304, 3.21927362, 4.881007895,
   0.464098185, 0.107357506, 0.070984833, 0.02498821, 0.005946372,
   -0.029370259, -0.047337036, -4.00475505, -87.4751, 96.27782, 46.14923,
   -39.7315, -85.4392, 119.7536, 20.53815, -120.785, -31.5908, 115.4875},
  {6, 14, 90.6872, 88.92534, 87.49887, 87.21061, 86.52311, 295.6847, 276.13935,
   274.06372, 277.57342, 272.6425, 270.61495, 270.44468, 268.31745,
   183.35198, -0.01199419, 0.018757455, 0.043666824, 0.048703282,
   0.060720456, 0.464098185, 0.107357506, 0.070984833, 0.132567713,
   0.046136684, 0.010733108, 0.007761208, -0.029370259, -3.531537655,
   51.26124, 103.272, -56.5828, -86.2531, -124.948, 46.14923, -39.7315,
   -85.4392, 113.0404, 78.84137, 53.43819, 33.3302, -120.785, 114.4671 },
  {7, 4, 92.74585, 268.31745, 182.69498, 177.59474, -0.047942479, -0.029370259,
   -3.749798971, -3.863569267, -125.701, -120.785, 58.47524, 125.4348},
  {8, 3, 177.35547, 0.86966, 268.31745, -3.768703238, 4.881007895,
   -0.029370259, 124.6866, 96.27782, -120.785},
  {9, 7, 179.24304, 88.11291, 87.21061, 81.3107, 4.5794, 267.2888, 183.35198,
   -4.00475505, 0.03294189, 0.048703282, 0.152241607, 3.21927362, -0.047337036,
```

-3.531537655, 115.4875, 18.61934, -86.2531, -45.6468, -87.4751, -31.5908, 114.4671},
{10, 1, 100.01633, -0.175715246, -62.0194},
{11, 6, 182.26596, 105.75503, 88.92534, 86.52311, 0.86966, 268.31745,
-3.743796186, -0.278509408, 0.018757455, 0.060720456, 4.881007895,
-0.029370259, 123.2007, -109.863, 103.272, -124.948, 96.27782, -120.785},
{12, 7, 177.59474, 177.35547, 92.74585, 91.22108, 87.21061, 183.35198, 182.69498,
-3.863569267, -3.768703238, -0.047942479, -0.02131348, 0.048703282, -3.531537655,
-3.749798971, 125.4348, 124.6866, -125.701, -14.4447, -86.2531, 114.4671, 58.47524},
{13, 6, 179.24304, 181.05416, 180.78075, 183.35198, 267.2888, 268.31745,
-4.00475505, -4.688601695, -4.988858954, -3.531537655, -0.047337036,
-0.029370259, 115.4875, -115.427, -124.782, 114.4671, -31.5908, -120.785},
{14, 11, 88.51959, 87.49887, 87.21061, 86.52311, 81.3107, 4.5794, 277.57342,
275.6847, 274.03451, 274.06372, 267.2888, 0.025840904, 0.043666824,
0.048703282, 0.060720456, 0.152241607, 3.21927362, 0.132567713, 0.464098185,
0.070473775, 0.070984833, -0.047337036, 66.3944, -56.5828, -86.2531, -124.948,
-45.6468, -87.4751, 113.0404, 46.14923, -82.6981, -85.4392, -31.5908},
{15, 2, 86.52311, 179.24304, 0.060720456, -4.00475505, -124.948, 115.4875},
{16, 1, 272.6425, 0.046136684, 78.84137 },
{17, 2, 270.89529, 180.34045, 0.015626391, -5.81885821, 82.92338, -120.33},
{18, 12, 88.11291, 87.21061, 81.3107, 4.5794, 358.11616, 357.56981,
277.57342, 276.13935, 271.43157, 270.9107, 270.3407, 183.35198, 0.03294189,
0.048703282, 0.152241607, 3.21927362, 4.107971806, 3.853254768,
0.132567713, 0.107357506, 0.02498821, 0.015895383, 0.005946372,
-3.531537655, 18.61934, -86.2531, -45.6468, -87.4751, 119.8765,
82.265, 113.0404, -39.7315, 119.7536, 84.37537, 20.53815, 114.4671},
{19, 0, ,}, {20, 1, 358.11616, 4.107971806 , 119.8765 }, {21, 0, ,},
{22, 1, 275.6847, 0.464098185 , 46.14923 },
{23, 2, 179.24304, 267.2888, -4.00475505, -0.047337036, 115.4875, -31.5908},
{24, 3, 105.75503, 268.31745, 183.35198, -0.278509408, -0.029370259, -3.531537655,
-109.863, -120.785, 114.4671}, {25, 1, 86.52311, 0.060720456 , -124.948 },
{26, 2, 177.59474, 177.35547, -3.863569267, -3.768703238, 125.4348, 124.6866},
{27, 4, 177.59474, 177.35547, 357.56981, 267.2888, -3.863569267, -3.768703238,
3.853254768, -0.047337036, 125.4348, 124.6866, 82.265, -31.5908},
{28, 7, 91.91904, 92.26596, 358.11616, 277.57342, 267.2888, 183.35198, 180.34045,
-0.033499831, -0.039558776, 4.107971806, 0.132567713, -0.047337036, -3.531537655,
-5.81885821, -91.5077, -115.506, 119.8765, 113.0404, -31.5908, 114.4671, -120.33},
{29, 3, 92.26596, 87.21061, 358.11616, -0.039558776, 0.048703282,
4.107971806, -115.506, -86.2531, 119.8765},
{30, 2, 4.5794, 277.57342, 3.21927362, 0.132567713, -87.4751, 113.0404},
{31, 3, 91.81836, 276.13935, 179.24304, -0.031741698,
0.107357506, -4.00475505, -82.3385, -39.7315, 115.4875},
{32, 2, 180.34045, 355.9033, -5.81885821, 3.330766215, -120.33, -98.9595},
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-104.988, -56.5828, 125.612, 11.8068, 114.321, 31.3832, -115.403, 113.04, -39.7315},
{158, 5, 7.93252, 7.23062, 3.96261, 357.715, 352.508, 2.678, 2.76172,
3.36407, 3.91493, 2.72611, 125.612, 102.302, -92.2118, -52.118, 76.2157},
{159, 2, 266.375, 180.34, -0.0633115, -5.81886, -73.4891, -120.33},
{160, 4, 181.831, 100.202, 5.73129, 270.341, -4.13648, -0.179011,
2.9946, 0.00594637, -46.9084, -40.6786, -66.0621, 20.5382},
{161, 11, 352.842, 268.049, 267.29, 265.602, 187.428, 178.704, 178.524, 99.1881,

```
 99.9334, 84.52, 84.5955, 2.7718, -0.0340646, -0.0473114, -0.0768317, -2.73469,
 -4.48177, -4.35187, -0.161054, -0.174246, 0.095789, 0.0944658, 104.877, -106.918,
 -31.7701, 124.809, -110.367, 45.2275, 65.5297, -122.741, -70.8915, 37.5883, 28.4137},
{162, 2, 96.3451, 97.5765, -0.129258, -0.132621, 108.938, -23.437},
{163, 12, 267.056, 266.375, 177.74, 177.595, 177.355, 91.5927, 88.4004,
 86.9797, 83.7778, 5.73, 8.14689, 353.427, -0.0514051, -0.0633115,
 -3.92582, -3.86357, -3.7687, -0.0278009, 0.027922, 0.0527394, 0.108811,
 2.99482, 2.64205, 2.85732, -121.535, -73.4891, 122.392, 125.435,
 124.687, -58.9075, 53.189, -104.988, 108.991, -66.2004, 120.633, 126.},
{164, 10, 186.804, 186.751, 185.46, 185.265, 179.114, 177.355, 99.9334,
 90.6872, 85.489, 270.911, -2.82267, -2.83059, -3.04313, -3.07953, -4.86267,
 -3.7687, -0.174246, -0.0119942, 0.0788133, 0.0158954, -125.084, -124.093,
 -13.359, 11.1561, -5.47534, 124.687, -70.8915, 51.2612, -77.8484, 84.3754},
{165, 3, 274.517, 6.81512, 91.2211, 0.0789218, 2.82105, -0.0213135, -77.2327,
 63.9074, -14.4447}, {166, 2, 178.867, 353.427, -4.61683, 2.85732, 25.4497, 126.},
{167, 4, 96.979, 178.021, 182.266, 190.016, -0.12211, -4.05866,
 -3.92325, -2.43461, 50.2632, 109.284, 122.565, 41.7421},
{168, 4, 272.732, 178.367, 99.9334, 90.6872, 0.047705, -4.25109,
 -0.174246, -0.0119942, 69.7137, 81.5035, -70.8915, 51.2612}}
```

In[45]:=
```
s = Table [d[[j, 2]], {j, 1, 168}]
```

Out[45]=
```
{2, 4, 2, 11, 10, 14, 4, 3, 7, 1, 6, 7, 6, 11, 2, 1, 2, 12, 0, 1, 0, 1, 2, 3, 1, 2, 4, 7, 3,
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 1, 2, 2, 3, 3, 7, 2, 9, 1, 4, 0, 1, 4, 2, 3, 7, 1, 4, 4, 6, 1, 2, 2, 12, 2, 1, 2, 1, 4,
 7, 1, 3, 11, 1, 10, 2, 3, 3, 1, 3, 2, 6, 6, 3, 4, 3, 10, 4, 2, 1, 3, 9, 8, 2, 4, 1, 5,
 3, 2, 3, 8, 6, 5, 12, 5, 3, 3, 7, 10, 11, 10, 3, 16, 8, 2, 7, 8, 4, 3, 4, 10, 5, 10,
 3, 11, 6, 4, 6, 4, 5, 7, 1, 3, 2, 0, 3, 5, 8, 4, 9, 5, 2, 4, 11, 2, 12, 10, 3, 2, 4, 4}
```

In[46]:=
```
SPACEANGLE_SHOWER = Table[d[[j, i]], {j, 1, 168}, {i, 3, 2 + s[[j]]}]
```

Out[46]=
```
{{178.779, 270.911}, {89.0747, 89.3283, 270.572, 90.2979},
 {180.76, 271.626}, {87.4989, 274.064, 268.317, 267.289, 180.781,
  180.941, 181.831, 177.595, 177.355, 91.8184, 91.8736}, {4.5794, 0.86966,
  295.685, 276.139, 274.064, 271.432, 270.341, 268.317, 267.289, 179.243},
 {90.6872, 88.9253, 87.4989, 87.2106, 86.5231, 295.685, 276.139,
  274.064, 277.573, 272.643, 270.615, 270.445, 268.317, 183.352},
 {92.7459, 268.317, 182.695, 177.595}, {177.355, 0.86966, 268.317},
 {179.243, 88.1129, 87.2106, 81.3107, 4.5794, 267.289, 183.352},
 {100.016}, {182.266, 105.755, 88.9253, 86.5231, 0.86966, 268.317},
 {177.595, 177.355, 92.7459, 91.2211, 87.2106, 183.352, 182.695},
 {179.243, 181.054, 180.781, 183.352, 267.289, 268.317}, {88.5196, 87.4989,
  87.2106, 86.5231, 81.3107, 4.5794, 277.573, 275.685, 274.035, 274.064, 267.289},
 {86.5231, 179.243}, {272.643}, {270.895, 180.34}, {88.1129, 87.2106, 81.3107,
  4.5794, 358.116, 357.57, 277.573, 276.139, 271.432, 270.911, 270.341, 183.352},
 {}, {358.116}, {}, {275.685}, {179.243, 267.289}, {105.755, 268.317, 183.352},
 {86.5231}, {177.595, 177.355}, {177.595, 177.355, 357.57, 267.289},
 {91.919, 92.266, 358.116, 277.573, 267.289, 183.352, 180.34},
```

{92.266, 87.2106, 358.116}, {4.5794, 277.573}, {91.8184, 276.139, 179.243},
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{180.34, 87.2106, 86.5231, 357.57, 277.573, 183.352}, {177.595, 90.6872, 86.5231,
84.1558, 83.8892, 5.73129, 4.5794, 277.573, 276.139, 275.685, 274.035, 272.643},
{}, {88.1129, 87.2106, 86.5231, 84.1558, 4.5794, 0.86966, 358.116,
357.57, 277.573, 275.685, 274.035, 272.643, 271.432, 267.289},
{}, {83.8892, 81.3107, 357.57, 355.903, 277.573, 274.064}, {182.695},
{276.139, 274.064}, {8.6893, 5.73129, 276.139, 275.685}, {183.352, 177.355, 105.755},
{177.595, 105.755, 0.86966, 277.573, 276.139, 271.432, 270.911,
268.317, 267.29, 267.289, 267.056, 266.375, 183.352, 182.695}, {},
{91.919, 268.317, 267.289, 182.266, 181.054, 180.781, 177.355}, {267.289},
{91.8184, 92.266, 92.7459, 177.355, 179.243, 180.916, 182.266, 182.695, 267.289,
270.341}, {270.911, 267.289, 183.352, 180.781, 180.916, 179.243, 177.595, 177.355},
{272.643, 91.8736}, {8.5781, 183.699}, {268.321, 183.452, 182.712, 180.93},
{97.7532, 182.266}, {92.7459, 182.266}, {91.8736, 96.9383}, {181.054},
{268.317}, {8.6893}, {276.139, 277.573}, {90.6872, 7.86313},
{88.4368, 268.305, 178.856}, {84.5673, 179.57, 357.57},
{272.635, 270.911, 268.049, 183.633, 181.831, 180.916, 178.867}, {269.213, 182.089},
{183.633, 183.497, 179.243, 177.595, 97.7532, 90.4766, 8.6893, 6.97579, 357.57},
{105.755}, {91.2211, 90.6872, 83.8892, 267.056}, {}, {91.8736},
{266.375, 355.903, 180.916, 179.243}, {86.5231, 276.139}, {183.497, 96.9383, 4.5794},
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{92.7459, 86.5231, 84.1558, 81.3107}, {266.375, 91.919, 87.6503, 8.6893},
{88.7288, 8.14689, 352.842, 277.573, 276.139, 270.445}, {85.5396}, {1.67177, 182.266},
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355.043, 352.842, 353.751, 276.344, 277.248, 272.643}, {85.1652, 354.108},
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7.20848, 6.81512, 1.23324, 357.11, 352.842, 275.354}, {266.375},
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355.043, 275.354}, {179.59, 270.341}, {85.1652, 83.7778, 358.073},
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{267.29, 97.7518, 92.7459, 83.7778, 7.20848, 6.81512, 4.71331,
5.65814, 275.834, 275.354}, {183.633, 87.5919, 5.11548, 272.643},
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{268.049, 180.781, 91.8736, 85.1652, 8.6893, 7.86313, 6.54714, 4.5393, 352.842},
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{266.375, 1.23324, 4.71331}, {186.804, 86.9797}, {178.524, 91.8736, 1.23324},
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 92.7459, 88.4004, 85.1652, 83.7778, 5.91513, 5.19835, 353.751, 276.139},
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 90.6872, 5.19835, 4.5794}, {182.654, 178.867, 178.367, 88.2946, 8.6893,
 6.97579, 6.54714, 7.86313, 358.073, 270.445}, {98.3645, 8.6893, 6.81512},
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 179.136, 104.944, 97.7518, 92.266, 6.78555, 5.94518, 352.842, 352.112},
{277.373, 270.341, 97.7532, 97.2709, 87.2106, 86.5231, 85.5396, 8.19893},
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{178.704, 87.2106, 8.19893}, {267.29, 7.93252, 7.23062, 357.57, 267.056},
{274.517, 100.202, 101.225, 85.9523, 84.6776, 3.96261, 3.04775, 358.073},
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{7.93252, 7.23062, 3.96261, 357.715, 352.508}, {266.375, 180.34},
{181.831, 100.202, 5.73129, 270.341}, {352.842, 268.049, 267.29, 265.602, 187.428,
 178.704, 178.524, 99.1881, 99.9334, 84.52, 84.5955}, {96.3451, 97.5765},
{267.056, 266.375, 177.74, 177.595, 177.355, 91.5927, 88.4004, 86.9797, 83.7778,
 5.73, 8.14689, 353.427}, {186.804, 186.751, 185.46, 185.265, 179.114, 177.355,
 99.9334, 90.6872, 85.489, 270.911}, {274.517, 6.81512, 91.2211}, {178.867, 353.427},
{96.979, 178.021, 182.266, 190.016}, {272.732, 178.367, 99.9334, 90.6872}}
```

In[47]:=
```
pasudoeta = Table[d[[j, i]], {j, 1, 168}, {i, 3 + s[[j]], 2 + 2 * s[[j]]}]
```

Out[47]=
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{{0, 0}, {0.477864, 0.208546, 1.60757, -0.84931}, {-5.01632, 0.028391},
{0.0436668, 0.0709848, -0.0293703, -0.047337, -4.98886, -4.80253, -4.13648,
 -3.86357, -3.7687, -0.0317417, -0.0327056}, {3.21927, 4.88101, 0.464098,
 0.107358, 0.0709848, 0.0249882, 0.00594637, -0.0293703, -0.047337, -4.00476},
{-0.0119942, 0.0187575, 0.0436668, 0.0487033, 0.0607205, 0.464098, 0.107358,
 0.0709848, 0.132568, 0.0461367, 0.0107331, 0.00776121, -0.0293703, -3.53154},
{-0.0479425, -0.0293703, -3.7498, -3.86357}, {-3.7687, 4.88101, -0.0293703},
```

{-4.00476, 0.0329419, 0.0487033, 0.152242, 3.21927, -0.047337, -3.53154},
{-0.175715}, {-3.7438, -0.278509, 0.0187575, 0.0607205, 4.88101, -0.0293703},
{-3.86357, -3.7687, -0.0479425, -0.0213135, 0.0487033, -3.53154, -3.7498},
{-4.00476, -4.6886, -4.98886, -3.53154, -0.047337, -0.0293703},
{0.0258409, 0.0436668, 0.0487033, 0.0607205, 0.152242, 3.21927, 0.132568,
 0.464098, 0.0704738, 0.0709848, -0.047337}, {0.0607205, -4.00476}, {0.0461367},
{0.0156264, -5.81886}, {0.0329419, 0.0487033, 0.152242, 3.21927, 4.10797, 3.85325,
 0.132568, 0.107358, 0.0249882, 0.0158954, 0.00594637, -3.53154}, {}, {4.10797},
{}, {0.464098}, {-4.00476, -0.047337}, {-0.278509, -0.0293703, -3.53154},
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{}, {0.106856, 0.152242, 3.85325, 3.33077, 0.132568, 0.0709848},
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{-0.20008, 0.108811}, {4.53169}, {0.0844837, 2.96687, 2.90795, 0.0789218},

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```

In[48]:=

```
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 {0, 0, 0, 0, 0, 0, 0, 0, -87.4751`, 96.27782`},
 {0, 0, 0, 0, 51.26124`, 103.272`, -56.5828`, -86.2531`, -124.948`, 46.14923`,
  -39.7315`, -85.4392`, 113.0404`, 78.84137`}, {0, 0, 0, 0}, {0, 0, 0},
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 {0, 0}, {0}, {0, 0}, {0, 0, 0, 0, 0, 0, 18.61934`, -86.2531`, -45.6468`,
  -87.4751`, 119.8765`, 82.265`}, {}, {0}, {}, {0}, {Null, 0},
 {Null, 0, 0}, {Null}, {Null, 0}, {0, 0, 0, 0}, {Null, 0, 0, 0, 0, 0, 0},
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  -66.0621`}, {}, {0, 0, 0, 0, 18.61934`, -86.2531`, -124.948`, 77.96657`,
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In[49]:= **PT_SHOWER = Table[d[[j, i]], {j, 1, 168}, {i, 3 + 2 * s[[j]], 2 + 3 * s[[j]]}]**

Out[49]= {{0, 0}, {112.866, 123.309, 48.5454, 91.1147}, {-125.123, 125.075},
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{115.488, 18.6193, -86.2531, -45.6468, -87.4751, -31.5908, 114.467},
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In[51]:=
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```

BinCounts::vectmat : The first argument is expected to be a vector or matrix. >>

BarChart::ldata : BinCounts[pasudorapdityshower] is not a valid dataset or list of datasets. >>

BarChart::ldata : BinCounts[pasudorapdityshower] is not a valid dataset or list of datasets. >>

Out[51]=
```
BarChart[BinCounts[pasudorapdityshower],
 ChartLabels → {-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5}]
```

In[52]:=
```
BinCounts[pasudorapdityshower]
```

BinCounts::vectmat : The first argument is expected to be a vector or matrix. >>

Out[52]=
```
BinCounts[pasudorapdityshower]
```

In[53]:=
```
BinLists[pasudorapdityshower]
```

BinLists::vectmat : The first argument is expected to be a vector or matrix. >>

Out[53]=
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BinLists[pasudorapdityshower]
```

In[54]:=
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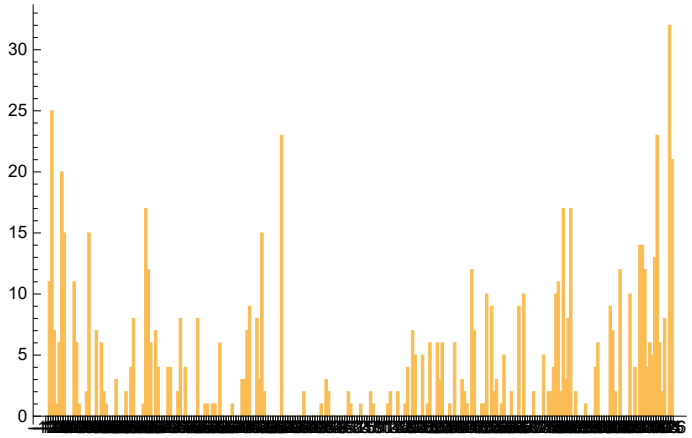
84, 81, 122, 38, 116, 19, 120, 66, -78, 64, -124, -48, 120, -110, -71, 101,
64, -124, 105, 95, -120, 101, -107, -66, 80, 116, -110, 119, 120, -32, -45,
-126, 109, 101, 64, -126, -74, 77, 22, 125, -46, -116, 79, 80, 102, 53, 77, 22,
121, -107, -125, -87, -42, 85, 126, 33, -124, 105, 95, -126, 51, 74, 38, 85,
-116, 125, 64, -32, -73, 82, -120, 28, 66, -93, -121, 125, -42, 109, -73, 119,
-126, -125, -105, 66, -87, 119, 125, -120, -125, -83, 126, 85, 22, 120, 79,
25, 82, 117, 101, -124, 4, 38, 28, -74, -45, 53, 21, -32, 66, 111, -23, 74, 28,
80, 33, 126, 85, 102, -110, 117, -116, 119, 80, -77, -125, 117, 116, 79, -110,
66, 55, 117, -46, -116, -66, -107, -32, -126, 53, -42, 109, -45, -111, 120,
-40, 83, -13, 109, 114, 45, 66, -120, -45, 51, -111, -87, 54, 25, 82, 41, 85,
80, 33, 126, 118, 33, -104, 85, 64, 120, 84, -93, -121, -107, -32, -110, -125,
32, -120, -45, -116, 61, -42, 105, 32, 102, 21, -45, 15, -86, -125, -83, 119,
-42, 61, 45, -116, -82, 51, 74, 45, 76, -125, 45, 66, 31, -39, 41, -95, 126,
45, -92, 126, 85, -124, -116, 80, -93, 66, -87, 119, -5, 74, 117, 126, 102,
64, 120, 82, 120, 105, -110, 53, 126, 85, -66, -124, 45, 117, -105, -57, 45,
119, -92, 120, 82, -110, 45, -95, 43, -41, 96, 119, 31, -115, 120, 105, 120,
-121, 45, -126, 28, -88, 45, 125, 121, 126, 31, 105, -110, 53, -103, 126, 85,
83, 0, 5, 4, -4, 85, 80, 126, 31, -115, -107, -110, -116, -125, 28, -66, 82,
-92, 102, 64, 105, -78, 126, 45, -86, 119, -32, 126, 102, 82, -122, -77, -41,
81, -114, 18, -92, 12, 118, 42, -57, 119, 70, -105, -57, 126, 12, 114, 31,
-115, 113, -40, 126, 102, -92, -52, 76, -73, -120, -47, -41, -66, 21, 105,
-107, -32, 125, -110, 45, 66, -123, -71, 38, 28, 109, -23, -122, -73, 122,
125, 125, -59, 53, -105, 109, -66, 121, 126, -125, -124, -13, 11, -5, 125,
-71, 51, -78, 84, -77, 64, -14, 25, 126, 50, 109, 123, 42, 70, 82, -71, 51}

In[57]:= **BarChart[BinCounts[g], ChartLabels → Range[-127, 127]]**

Out[57]=



In[58]:= **BinCounts[g]**

Out[58]= {0, 11, 25, 7, 1, 6, 20, 15, 0, 0, 0, 11, 6, 1, 0, 0, 2, 15, 0, 0, 7, 0, 6, 2, 1, 0, 0, 0,
3, 0, 0, 0, 2, 0, 4, 8, 0, 0, 0, 1, 17, 12, 6, 0, 7, 4, 0, 0, 0, 4, 4, 0, 0, 2, 8, 0, 4,
0, 0, 0, 0, 8, 0, 0, 1, 1, 0, 1, 1, 0, 6, 0, 0, 0, 0, 1, 0, 0, 0, 3, 3, 7, 9, 0, 0, 8,
3, 15, 2, 0, 0, 0, 0, 0, 0, 23, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 1, 0, 3,
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0, 0, 1, 4, 0, 7, 5, 0, 0, 5, 0, 1, 6, 0, 0, 6, 3, 6, 0, 0, 1, 0, 6, 0, 0, 3, 2, 1, 0,
12, 7, 0, 0, 1, 1, 10, 0, 9, 2, 3, 0, 1, 5, 0, 0, 2, 0, 0, 9, 0, 10, 0, 0, 0, 2, 0, 0,
0, 5, 0, 2, 2, 4, 10, 11, 2, 17, 3, 8, 17, 0, 2, 0, 0, 0, 1, 0, 0, 0, 4, 6, 0, 0, 0, 0,
9, 7, 2, 0, 12, 0, 0, 0, 10, 0, 4, 0, 14, 14, 12, 4, 6, 5, 13, 23, 6, 2, 8, 0, 32, 21}

In[59]:= **BinLists[g]**

Out[59]= {{}, {-126, -126, -126, -126, -126, -126, -126, -126, -126, -126},
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-125, -125, -125, -125, -125, -125, -125, -125, -125, -125, -125, -125},
{-124, -124, -124, -124, -124, -124, -124}, {-123},
{-122, -122, -122, -122, -122, -122}, {-121, -121, -121, -121, -121, -121, -121, -121,
-121, -121, -121, -121, -121, -121, -121, -121, -121, -121, -121, -121}, {-120,
-120, -120, -120, -120, -120, -120, -120, -120, -120, -120, -120, -120, -120},
{}, {}, {}, {-116, -116, -116, -116, -116, -116, -116, -116, -116, -116},
{-115, -115, -115, -115, -115, -115}, {-114}, {}, {}, {-111, -111},
{-110, -110, -110, -110, -110, -110, -110, -110, -110, -110, -110,
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{}, {-105, -105, -105, -105, -105, -105}, {-104, -104}, {-103}, {}, {},
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{-85, -85, -85, -85, -85, -85}, {}, {-83, -83, -83, -83, -83, -83, -83},
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{}, {}, {-74, -74}, {-73, -73, -73, -73, -73, -73, -73, -73}, {},
{-71, -71, -71, -71}, {}, {}, {}, {}, {-66, -66, -66, -66, -66, -66, -66, -66},
{}, {}, {-63}, {-62}, {}, {-60}, {-59}, {}, {-57, -57, -57, -57, -57, -57},
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{-40, -40, -40, -40, -40, -40, -40, -40, -40, -40, -40, -40, -40, -40, -40},
{-39, -39}, {}, {}, {}, {}, {}, {}, {-32, -32, -32, -32, -32, -32, -32, -32,
 -32, -32, -32, -32, -32, -32, -32, -32, -32, -32, -32, -32, -32, -32, -32, -32},
{}, {}, {}, {}, {}, {}, {}, {}, {-23, -23}, {}, {}, {}, {}, {}, {}, {-16}, {},
{-14, -14, -14}, {-13, -13}, {}, {}, {}, {}, {}, {}, {}, {-5, -5}, {-4}, {},
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{22, 22, 22, 22, 22}, {}, {}, {25, 25, 25, 25, 25}, {}, {27}, {28, 28, 28, 28, 28, 28},
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{81, 81}, {82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82, 82},
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{85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85, 85}, {}, {87, 87}, {},
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{103, 103}, {}, {105, 105, 105, 105, 105, 105, 105, 105, 105, 105, 105, 105}, {}, {},
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{}, {113, 113, 113, 113, 113, 113, 113, 113, 113, 113, 113, 113, 113, 113},
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{115, 115, 115, 115, 115, 115, 115, 115, 115, 115, 115, 115},
{116, 116, 116, 116}, {117, 117, 117, 117, 117, 117}, {118, 118, 118, 118, 118},
{119, 119, 119, 119, 119, 119, 119, 119, 119, 119, 119, 119, 119}, {120, 120, 120, 120, 120,
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{121, 121, 121, 121, 121, 121}, {122, 122}, {123, 123, 123, 123, 123, 123, 123, 123}, {},
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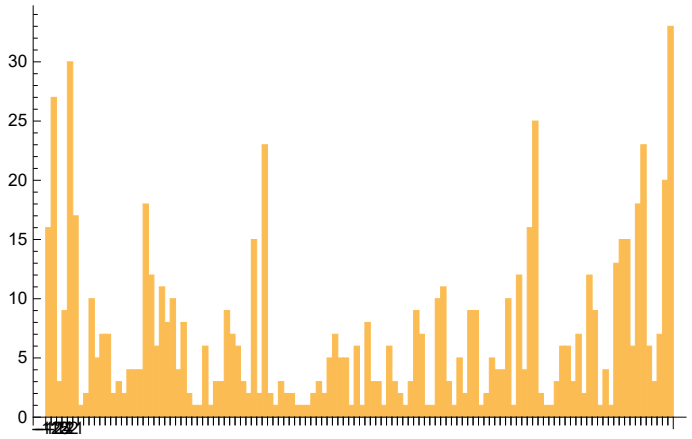
 125, 125, 125, 125, 125, 125, 125, 125, 125, 125, 125, 125, 125, 125, 125}, {126, 126, 126,
 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126, 126}}
```

In[60]:=
```
BarChart[{16, 27, 3, 9, 30, 17, 1, 2, 10, 5, 7, 7, 2, 3, 2, 4, 4, 4, 18, 12, 6, 11, 8, 10, 4, 8,
  2, 1, 1, 6, 1, 3, 3, 9, 7, 6, 3, 2, 15, 2, 23, 2, 1, 3, 2, 2, 1, 1, 1, 2, 3, 2, 5, 7, 5, 5, 1,
  6, 1, 8, 3, 3, 1, 6, 3, 2, 1, 3, 9, 7, 1, 1, 10, 11, 3, 1, 5, 2, 9, 9, 1, 2, 5, 4, 4, 10, 1, 12,
  4, 16, 25, 2, 1, 1, 3, 6, 6, 3, 7, 2, 12, 9, 1, 4, 1, 13, 15, 15, 6, 18, 23, 6, 3, 7, 20, 33},
 ChartLabels → {" -125", "-124", "-122", "-121"}]
```

Out[60]=



In[61]:=
```
(*\\correlation  betwen values of the psudorapdity
 and transverse momentum of each star in one cell as
 following:{psudoradiy1,psudoradiy2,psudoradiy3,..,pt1,pt2,pt3,...}*\
```

In[61]:=
```
column = {5, 6, 6, 5, 11, 6, 5, 5, 14, 8, 15, 10, 8, 6, 11, 13, 5, 6, 6, 5, 13, 6, 9, 10,
  6, 7, 9, 12, 8, 9, 12, 7, 12, 15, 8, 8, 11, 5, 9, 6, 3, 9, 6, 14, 5, 14, 8, 16,
  11, 6, 3, 6, 7, 8, 8, 7, 11, 9, 7, 5, 6, 9, 16, 2, 21, 5, 8, 5, 5, 7, 13, 2, 13,
  4, 4, 9, 10, 4, 6, 3, 14, 12, 8, 5, 7, 4, 14, 8, 6, 9, 7, 8, 6, 5, 16, 6, 7, 9,
  10, 12, 5, 8, 6, 8, 13, 7, 3, 7, 12, 10, 5, 3, 6, 6, 10, 5, 7, 9, 8, 10, 6, 8, 9,
  7, 9, 6, 16, 6, 7, 15, 13, 5, 15, 18, 7, 6, 6, 21, 9, 11, 9, 11, 9, 10, 8, 10,
  10, 14, 14, 6, 7, 4, 9, 13, 12, 11, 14, 15, 9, 6, 5, 4, 14, 13, 12, 8, 12, 7}
```

Out[61]=
```
{5, 6, 6, 5, 11, 6, 5, 5, 14, 8, 15, 10, 8, 6, 11, 13, 5, 6, 6, 5, 13, 6, 9, 10,
 6, 7, 9, 12, 8, 9, 12, 7, 12, 15, 8, 8, 11, 5, 9, 6, 3, 9, 6, 14, 5, 14, 8, 16,
 11, 6, 3, 6, 7, 8, 8, 7, 11, 9, 7, 5, 6, 9, 16, 2, 21, 5, 8, 5, 5, 7, 13, 2, 13,
 4, 4, 9, 10, 4, 6, 3, 14, 12, 8, 5, 7, 4, 14, 8, 6, 9, 7, 8, 6, 5, 16, 6, 7, 9,
 10, 12, 5, 8, 6, 8, 13, 7, 3, 7, 12, 10, 5, 3, 6, 6, 10, 5, 7, 9, 8, 10, 6, 8, 9,
 7, 9, 6, 16, 6, 7, 15, 13, 5, 15, 18, 7, 6, 6, 21, 9, 11, 9, 11, 9, 10, 8, 10,
 10, 14, 14, 6, 7, 4, 9, 13, 12, 11, 14, 15, 9, 6, 5, 4, 14, 13, 12, 8, 12, 7}
```

In[62]:=
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f = {{star_index = 1, No_ofshower = 2, spaceangle_S1 = 178.77892,
   spaceangle_S2 = 270.9107, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   0, 0, 0, 0, pasudo_S1 = -4.5416, pasudo_S2 = 0.015895, 0,
   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, PT_S1 = 36.25464,
   PT_S2 = 84.375370, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
  {2, 4, 89.07474, 89.32834, 270.57248, 90.29786, 0, 0, 0, 0, 0, 0,
   0, 0, 0, 0, 0, 0, 0, 0, 0, 0.477864, 0.208546, 1.607566, -0.84931,
   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 112.8662, 123.3088,
   48.54535, 91.11471, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,},
  {3, 2, 180.7596, 271.62649, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   0, -5.01632, 0.028391, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   -125.123, 125.0746, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
  {4, 11, 87.49887, 274.06372, 268.31745, 267.2888, 180.78075, 180.94066,
   181.8309, 177.59474, 177.35547, 91.81836, 91.87356, 0, 0, 0, 0,
   0, 0, 0, 0.043666824, 0.070984833, -0.029370259, -0.047337036,
   -4.988858954, -4.802525206, -4.136481397, -3.863569267,
```

```
 -3.768703238, -0.031741698, -0.03270562, 0, 0, 0, 0, 0, 0, 0,
 -56.5828, -85.4392, -120.785, -31.5908, -124.782, -120.407,
 -46.9084, 125.4348, 124.6866, -82.3385, -87.47510, 0, 0, 0, 0, 0, 0},
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 3.21927362, 4.881007895, 0.464098185, 0.107357506, 0.070984833,
 0.02498821, 0.005946372, -0.029370259, -0.047337036, -4.00475505, 0,
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 119.7536, 20.53815, -120.785, -31.5908, 115.48750, 0, 0, 0, 0, 0, 0, 0, 0},
{6, 14, 90.6872, 88.92534, 87.49887, 87.21061, 86.52311, 295.6847,
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 183.35198, 0, 0, 0, 0, 0, -0.01199419, 0.018757455, 0.043666824, 0.048703282,
 0.060720456, 0.464098185, 0.107357506, 0.070984833, 0.132567713, 0.046136684,
 0.010733108, 0.007761208, -0.029370259, -3.531537655, 0, 0, 0, 0, 0,
 51.26124, 103.272, -56.5828, -86.2531, -124.948, 46.14923, -39.7315,
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 -3.863569267, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -125.701,
 -120.785, 58.47524, 125.4348, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,},
{8, 3, 177.35547, 0.86966, 268.31745, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, -3.768703238, 4.881007895, -0.029370259, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
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Out[62]= {{1, 2, 178.779, 270.911, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
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-125.123, 125.075, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{4, 11, 87.4989, 274.064, 268.317, 267.289, 180.781, 180.941, 181.831,
177.595, 177.355, 91.8184, 91.8736, 0, 0, 0, 0, 0, 0, 0, 0.0436668,
0.0709848, -0.0293703, -0.047337, -4.98886, -4.80253, -4.13648,
-3.86357, -3.7687, -0.0317417, -0.0327056, 0, 0, 0, 0, 0, 0, 0,
-56.5828, -85.4392, -120.785, -31.5908, -124.782, -120.407,
-46.9084, 125.435, 124.687, -82.3385, -87.4751, 0, 0, 0, 0, 0, 0},
{5, 10, 4.5794, 0.86966, 295.685, 276.139, 274.064, 271.432, 270.341,
268.317, 267.289, 179.243, 0, 0, 0, 0, 0, 0, 0, 0, 3.21927, 4.88101, 0.464098,
0.107358, 0.0709848, 0.0249882, 0.00594637, -0.0293703, -0.047337, -4.00476,
0, 0, 0, 0, 0, 0, 0, 0, -87.4751, 96.2778, 46.1492, -39.7315, -85.4392,
119.754, 20.5382, -120.785, -31.5908, 115.488, 0, 0, 0, 0, 0, 0, 0, 0},
{6, 14, 90.6872, 88.9253, 87.4989, 87.2106, 86.5231, 295.685, 276.139,
274.064, 277.573, 272.643, 270.615, 270.445, 268.317, 183.352, 0, 0, 0, 0, 0,
-0.0119942, 0.0187575, 0.0436668, 0.0487033, 0.0607205, 0.464098, 0.107358,
0.0709848, 0.132568, 0.0461367, 0.0107331, 0.00776121, -0.0293703, -3.53154,
0, 0, 0, 0, 0, 51.2612, 103.272, -56.5828, -86.2531, -124.948, 46.1492,
-39.7315, -85.4392, 113.04, 78.8414, 53.4382, 33.3302, -120.785, 114.467},
{7, 4, 92.7459, 268.317, 182.695, 177.595, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, -0.0479425, -0.0293703, -3.7498, -3.86357,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -125.701, -120.785,
58.4752, 125.435, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, Null},
{8, 3, 177.355, 0.86966, 268.317, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, -3.7687, 4.88101, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 124.687, 96.2778, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{9, 7, 179.243, 88.1129, 87.2106, 81.3107, 4.5794, 267.289, 183.352, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, -4.00476, 0.0329419, 0.0487033, 0.152242, 3.21927,
-0.047337, -3.53154, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.488, 18.6193, -86.2531,
-45.6468, -87.4751, -31.5908, 114.467, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{10, 1, 100.016, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, -0.175715, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
-62.0194, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{11, 6, 182.266, 105.755, 88.9253, 86.5231, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0.86966, 268.317, -3.7438, -0.278509, 0.0187575, 0.0607205,
4.88101, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 123.201, -109.863,
103.272, -124.948, 96.2778, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{12, 7, 177.595, 177.355, 92.7459, 91.2211, 87.2106, 183.352, 182.695, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -3.86357, -3.7687, -0.0479425, -0.0213135,
0.0487033, -3.53154, -3.7498, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 125.435, 124.687,
-125.701, -14.4447, -86.2531, 114.467, 58.4752, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},

```
{13, 6, 179.243, 181.054, 180.781, 183.352, 267.289, 268.317, 0, 0, 0, 0,
 0, 0, 0, 0, 0, 0, 0, 0, -4.00476, -4.6886, -4.98886, -3.53154, -0.047337,
 -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.488, -115.427,
 -124.782, 114.467, -31.5908, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
```

In[63]:=
```
{{1, 2, 178.77892`, 270.9107`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, -4.5416`, 0.015895`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 36.25464`, 84.37537`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {2, 4, 89.07474`, 89.32834`, 270.57248`, 90.29786`, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 0, 0, 0, 0, 0.477864`, 0.208546`, 1.607566`, -0.84931`,
  0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 112.8662`, 123.3088`,
  48.54535`, 91.11471`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, Null},
 {3, 2, 180.7596`, 271.62649`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, -5.01632`, 0.028391`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  -125.123`, 125.0746`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {4, 11, 87.49887`, 274.06372`, 268.31745`, 267.2888`, 180.78075`,
  180.94066`, 181.8309`, 177.59474`, 177.35547`, 91.81836`, 91.87356`, 0, 0,
  0, 0, 0, 0, 0, 0.043666824`, 0.070984833`, -0.029370259`, -0.047337036`,
  -4.988858954`, -4.802525206`, -4.136481397`, -3.863569267`,
  -3.768703238`, -0.031741698`, -0.03270562`, 0, 0, 0, 0, 0, 0, 0,
  -56.5828`, -85.4392`, -120.785`, -31.5908`, -124.782`, -120.407`,
  -46.9084`, 125.4348`, 124.6866`, -82.3385`, -87.4751`, 0, 0, 0, 0, 0, 0},
 {5, 10, 4.5794`, 0.86966`, 295.6847`, 276.13935`, 274.06372`, 271.43157`,
  270.3407`, 268.31745`, 267.2888`, 179.24304`, 0, 0, 0, 0, 0, 0, 0, 0,
  3.21927362`, 4.881007895`, 0.464098185`, 0.107357506`, 0.070984833`,
  0.02498821`, 0.005946372`, -0.029370259`, -0.047337036`, -4.00475505`, 0,
  0, 0, 0, 0, 0, 0, 0, -87.4751`, 96.27782`, 46.14923`, -39.7315`, -85.4392`,
  119.7536`, 20.53815`, -120.785`, -31.5908`, 115.4875`, 0, 0, 0, 0, 0, 0, 0, 0},
 {6, 14, 90.6872`, 88.92534`, 87.49887`, 87.21061`, 86.52311`, 295.6847`,
  276.13935`, 274.06372`, 277.57342`, 272.6425`, 270.61495`, 270.44468`,
  268.31745`, 183.35198`, 0, 0, 0, 0, -0.01199419`, 0.018757455`,
  0.043666824`, 0.048703282`, 0.060720456`, 0.464098185`, 0.107357506`,
  0.070984833`, 0.132567713`, 0.046136684`, 0.010733108`, 0.007761208`,
  -0.029370259`, -3.531537655`, 0, 0, 0, 0, 51.26124`, 103.272`, -56.5828`,
  -86.2531`, -124.948`, 46.14923`, -39.7315`, -85.4392`, 113.0404`,
  78.84137`, 53.43819`, 33.3302`, -120.785`, 114.4671`, 0, 0, 0, 0},
 {7, 4, 92.74585`, 268.31745`, 182.69498`, 177.59474`, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 0, 0, 0, 0, -0.047942479`, -0.029370259`, -3.749798971`,
  -3.863569267`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -125.701`, -120.785`,
  58.47524`, 125.4348`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, Null},
 {8, 3, 177.35547`, 0.86966`, 268.31745`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  -3.768703238`, 4.881007895`, -0.029370259`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 124.6866`, 96.27782`, -120.785`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {9, 7, 179.24304`, 88.11291`, 87.21061`, 81.3107`, 4.5794`, 267.2888`,
  183.35198`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -4.00475505`, 0.03294189`,
  0.048703282`, 0.152241607`, 3.21927362`, -0.047337036`, -3.531537655`,
```

```
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.4875`, 18.61934`, -86.2531`, -45.6468`,
 -87.4751`, -31.5908`, 114.4671`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{10, 1, 100.01633`, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, -0.175715246`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 -62.0194`, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{11, 6, 182.26596`, 105.75503`, 88.92534`, 86.52311`, 0, 0, 0, 0, 0, 0,
 0, 0, 0, 0, 0, 0, 0.86966`, 268.31745`, -3.743796186`, -0.278509408`,
 0.018757455`, 0.060720456`, 4.881007895`, -0.029370259`, 0,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 123.2007`, -109.863`, 103.272`,
 -124.948`, 96.27782`, -120.785`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{12, 7, 177.59474`, 177.35547`, 92.74585`, 91.22108`, 87.21061`, 183.35198`,
 182.69498`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -3.863569267`, -3.768703238`,
 -0.047942479`, -0.02131348`, 0.048703282`, -3.531537655`, -3.749798971`,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 125.4348`, 124.6866`, -125.701`, -14.4447`,
 -86.2531`, 114.4671`, 58.47524`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{13, 6, 179.24304`, 181.05416`, 180.78075`, 183.35198`, 267.2888`,
 268.31745`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -4.00475505`, -4.688601695`,
 -4.988858954`, -3.531537655`, -0.047337036`, -0.029370259`, 0,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.4875`, -115.427`, -124.782`,
 114.4671`, -31.5908`, -120.785`, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
```

Out[63]=

```
{{1, 2, 178.779, 270.911, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, -4.5416, 0.015895, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 36.2546, 84.3754, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {2, 4, 89.0747, 89.3283, 270.572, 90.2979, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0.477864, 0.208546, 1.60757, -0.84931, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  112.866, 123.309, 48.5454, 91.1147, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, Null},
 {3, 2, 180.76, 271.626, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  -5.01632, 0.028391, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  -125.123, 125.075, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {4, 11, 87.4989, 274.064, 268.317, 267.289, 180.781, 180.941, 181.831,
  177.595, 177.355, 91.8184, 91.8736, 0, 0, 0, 0, 0, 0, 0, 0.0436668,
  0.0709848, -0.0293703, -0.047337, -4.98886, -4.80253, -4.13648,
  -3.86357, -3.7687, -0.0317417, -0.0327056, 0, 0, 0, 0, 0, 0, 0,
  -56.5828, -85.4392, -120.785, -31.5908, -124.782, -120.407,
  -46.9084, 125.435, 124.687, -82.3385, -87.4751, 0, 0, 0, 0, 0, 0},
 {5, 10, 4.5794, 0.86966, 295.685, 276.139, 274.064, 271.432, 270.341,
  268.317, 267.289, 179.243, 0, 0, 0, 0, 0, 0, 0, 0, 3.21927, 4.88101, 0.464098,
  0.107358, 0.0709848, 0.0249882, 0.00594637, -0.0293703, -0.047337, -4.00476,
  0, 0, 0, 0, 0, 0, 0, 0, -87.4751, 96.2778, 46.1492, -39.7315, -85.4392,
  119.754, 20.5382, -120.785, -31.5908, 115.488, 0, 0, 0, 0, 0, 0, 0, 0},
 {6, 14, 90.6872, 88.9253, 87.4989, 87.2106, 86.5231, 295.685, 276.139, 274.064,
  277.573, 272.643, 270.615, 270.445, 268.317, 183.352, 0, 0, 0, 0, -0.0119942,
  0.0187575, 0.0436668, 0.0487033, 0.0607205, 0.464098, 0.107358, 0.0709848,
  0.132568, 0.0461367, 0.0107331, 0.00776121, -0.0293703, -3.53154, 0, 0,
  0, 0, 51.2612, 103.272, -56.5828, -86.2531, -124.948, 46.1492, -39.7315,
  -85.4392, 113.04, 78.8414, 53.4382, 33.3302, -120.785, 114.467, 0, 0, 0, 0},
```

```
{7, 4, 92.7459, 268.317, 182.695, 177.595, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 0, 0, 0, 0, -0.0479425, -0.0293703, -3.7498, -3.86357,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -125.701, -120.785,
 58.4752, 125.435, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, Null},
{8, 3, 177.355, 0.86966, 268.317, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, -3.7687, 4.88101, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 124.687, 96.2778, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{9, 7, 179.243, 88.1129, 87.2106, 81.3107, 4.5794, 267.289, 183.352, 0, 0,
 0, 0, 0, 0, 0, 0, 0, 0, -4.00476, 0.0329419, 0.0487033, 0.152242, 3.21927,
 -0.047337, -3.53154, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.488, 18.6193, -86.2531,
 -45.6468, -87.4751, -31.5908, 114.467, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{10, 1, 100.016, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, -0.175715, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 -62.0194, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{11, 6, 182.266, 105.755, 88.9253, 86.5231, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 0.86966, 268.317, -3.7438, -0.278509, 0.0187575, 0.0607205,
 4.88101, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 123.201, -109.863,
 103.272, -124.948, 96.2778, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{12, 7, 177.595, 177.355, 92.7459, 91.2211, 87.2106, 183.352, 182.695, 0,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -3.86357, -3.7687, -0.0479425, -0.0213135,
 0.0487033, -3.53154, -3.7498, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 125.435, 124.687,
 -125.701, -14.4447, -86.2531, 114.467, 58.4752, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{13, 6, 179.243, 181.054, 180.781, 183.352, 267.289, 268.317, 0, 0, 0, 0,
 0, 0, 0, 0, 0, 0, 0, 0, -4.00476, -4.6886, -4.98886, -3.53154, -0.047337,
 -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.488, -115.427,
 -124.782, 114.467, -31.5908, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
```

In[64]:=
```
gscal = (SparseArray[{{i_, j_} :> column[[i]] /; j == 2, {i_, j_} :> f[[i, j]] /; j == 1,
     {i_, j_} :> f[[i, j - 1]] /; j > 1}, {13, 55}]) // Normal
```

Out[64]=
```
{{1, 5, 2, 178.779, 270.911, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, -4.5416, 0.015895, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 36.2546, 84.3754, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {2, 6, 4, 89.0747, 89.3283, 270.572, 90.2979, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0.477864, 0.208546, 1.60757, -0.84931, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 112.866, 123.309, 48.5454, 91.1147, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {3, 6, 2, 180.76, 271.626, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, -5.01632, 0.028391, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, -125.123, 125.075, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
 {4, 5, 11, 87.4989, 274.064, 268.317, 267.289, 180.781, 180.941,
  181.831, 177.595, 177.355, 91.8184, 91.8736, 0, 0, 0, 0, 0, 0, 0,
  0.0436668, 0.0709848, -0.0293703, -0.047337, -4.98886, -4.80253,
  -4.13648, -3.86357, -3.7687, -0.0317417, -0.0327056, 0, 0, 0, 0, 0,
  0, 0, -56.5828, -85.4392, -120.785, -31.5908, -124.782, -120.407,
  -46.9084, 125.435, 124.687, -82.3385, -87.4751, 0, 0, 0, 0, 0},
 {5, 11, 10, 4.5794, 0.86966, 295.685, 276.139, 274.064, 271.432, 270.341,
  268.317, 267.289, 179.243, 0, 0, 0, 0, 0, 0, 0, 0, 3.21927, 4.88101, 0.464098,
```

```
 0.107358, 0.0709848, 0.0249882, 0.00594637, -0.0293703, -0.047337,
 -4.00476, 0, 0, 0, 0, 0, 0, 0, 0, -87.4751, 96.2778, 46.1492, -39.7315,
 -85.4392, 119.754, 20.5382, -120.785, -31.5908, 115.488, 0, 0, 0, 0, 0, 0},
{6, 6, 14, 90.6872, 88.9253, 87.4989, 87.2106, 86.5231, 295.685, 276.139,
 274.064, 277.573, 272.643, 270.615, 270.445, 268.317, 183.352, 0, 0, 0, 0, 0,
 -0.0119942, 0.0187575, 0.0436668, 0.0487033, 0.0607205, 0.464098, 0.107358,
 0.0709848, 0.132568, 0.0461367, 0.0107331, 0.00776121, -0.0293703, -3.53154,
 0, 0, 0, 0, 0, 51.2612, 103.272, -56.5828, -86.2531, -124.948, 46.1492,
 -39.7315, -85.4392, 113.04, 78.8414, 53.4382, 33.3302, -120.785, 114.467},
{7, 5, 4, 92.7459, 268.317, 182.695, 177.595, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, -0.0479425, -0.0293703, -3.7498, -3.86357, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 0, -125.701, -120.785, 58.4752, 125.435, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{8, 5, 3, 177.355, 0.86966, 268.317, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, -3.7687, 4.88101, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 124.687, 96.2778, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{9, 14, 7, 179.243, 88.1129, 87.2106, 81.3107, 4.5794, 267.289, 183.352,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -4.00476, 0.0329419, 0.0487033, 0.152242,
 3.21927, -0.047337, -3.53154, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.488, 18.6193,
 -86.2531, -45.6468, -87.4751, -31.5908, 114.467, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{10, 8, 1, 100.016, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 0, -0.175715, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, -62.0194, Null, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{11, 15, 6, 182.266, 105.755, 88.9253, 86.5231, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 0, 0.86966, 268.317, -3.7438, -0.278509, 0.0187575, 0.0607205,
 4.88101, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 123.201, -109.863,
 103.272, -124.948, 96.2778, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{12, 10, 7, 177.595, 177.355, 92.7459, 91.2211, 87.2106, 183.352, 182.695,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, -3.86357, -3.7687, -0.0479425, -0.0213135,
 0.0487033, -3.53154, -3.7498, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 125.435, 124.687,
 -125.701, -14.4447, -86.2531, 114.467, 58.4752, 0, 0, 0, 0, 0, 0, 0, 0, 0},
{13, 8, 6, 179.243, 181.054, 180.781, 183.352, 267.289, 268.317, 0, 0,
 0, 0, 0, 0, 0, 0, 0, 0, 0, -4.00476, -4.6886, -4.98886, -3.53154,
 -0.047337, -0.0293703, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 115.488, -115.427,
 -124.782, 114.467, -31.5908, -120.785, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}}
```

In[65]:= **MatrixForm[gscal]**

Out[65]//MatrixForm=

1	5	2	178.779	270.911	0	0	0	0	0	0
2	6	4	89.0747	89.3283	270.572	90.2979	0	0	0	0
3	6	2	180.76	271.626	0	0	0	0	0	0
4	5	11	87.4989	274.064	268.317	267.289	180.781	180.941	181.831	177.595
5	11	10	4.5794	0.86966	295.685	276.139	274.064	271.432	270.341	268.317
6	6	14	90.6872	88.9253	87.4989	87.2106	86.5231	295.685	276.139	274.064
7	5	4	92.7459	268.317	182.695	177.595	0	0	0	0
8	5	3	177.355	0.86966	268.317	0	0	0	0	0
9	14	7	179.243	88.1129	87.2106	81.3107	4.5794	267.289	183.352	0
10	8	1	100.016	Null	0	0	0	0	0	0
11	15	6	182.266	105.755	88.9253	86.5231	0	0	0	0
12	10	7	177.595	177.355	92.7459	91.2211	87.2106	183.352	182.695	0
13	8	6	179.243	181.054	180.781	183.352	267.289	268.317	0	0

In[66]:= **BinCounts[gscal]**

Out[66]= SparseArray[

Specified elements: 12

Dimensions: {14, 12, 14, 179, 275, 297, 278, 276, 297, 278, 276, 279,
274, 272, 272, 270, 185, 2, 2, 2, 270, 10, 10, 7, 5, 10, 6, 6, 5, 5, 6, 2, 2, 2, 2, 5, 2,
2, 2, 252, 247, 230, 251, 222, 241, 240, 247, 165, 202, 202, 80, 55, 35, 122, 116}

]