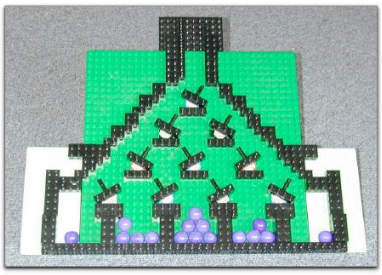
6 _____Calculating marble run

Calculating

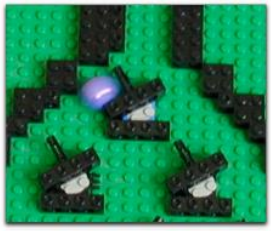
It is possible to manipulate coincidence a bit. To do so you can build a marble run cascade. In the chutes of this cascade you have always a constant distribution of marbles.

What shall you do:
Throw 16 marbles one after another into the below shown marble run without moving the trigger switch in between.



What do you observe:
After 16 marbles you will always have in the collecting pans a distribution of 1, 4, 6, 4, 1.

The mechanics:
The secret of this marble run lies in the construction and the alignment of the trigger switches. These trigger switches ensure that the marbles, which hit them, are guided alternately to the left and to the right side.



Why:
Why the distribution is like this and not different we do not want to explain in all details. Let's just say this: It is related to the potential ways of the marbles and to the picture below:

```
          1
        1   1
      1   2   1
    1   3   3   1
  1   4   6   4   1
```

An Experiment:
Set the trigger switches on an arbitrary starting position and throw the 16 marbles into the run. What happens?

A game:
Throw some of the marbles into the run and try to predict in which chute the next marble will end up. Then try it again with the next one that follows the next one, and so forth.

Another game for two persons:
One player gets the left two chutes and the other player gets the two on the right side. The marbles are thrown in in turns. Before every throw you may change a single trigger switch. The player who has in the end the most marbles wins. The marbles in the middle do not count for any player.