A GRAPHICAL ILLUSTRATION OF BINOMIAL DISTRIBUTIONS

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Binomial distribution, along with normal distribution, plays an important role in school mathematics. However, in all reality, students rely simply on memorization even for its simple properties such as average or variance therefore most students struggle to study binomial distribution and its applications. Although there are difficulties in studying binomial distribution, since it plays a vital role in increasing problem solving skills and mathematical balance in real life, one cannot neglect studying this subject. In this paper we suggest a program that shows various graphical illustrations of binomial distributions. The developed program could be contributes to not only increasing the student's interest but a simulator for combined binomial distributions.

VISUAL EFFECT IN CLASSROOM

A lot of traditional classes are faced with crisis in multi-media age. For example, a text book is no longer the most important material at developed and developing countries. Students want funny classes using materials such as cartoons, movies and games.

It is clear that colloquy is a better communication tool than words, and visual is better than colloquy. Visual effects are to increase the understanding of the student for the subject, and acceptance rate is quite fast. We remark the followings:

Seeing is worth a thousand words.- Oriental proverb
The editorial tries to explain, but the cartoon tells.- Ranan Lurie

GRAPHS OF BINOMIAL DISTRIBUTION

Although all of high school level statistics text book treat graphs of binomial distribution, especially normal approximation to binomial (see, for example, Lee et al., 2014; Moore, 2000; UCSMP, 1998), it is not quite contented.

UCSMP (1998) show the probabilities of getting x heads in 100 tosses when the probability of heads is 0.3, 0.4, 0.5, 0.6, 0.7 (see pp. 641-642). But many students confused the probability of head is 0.3 or 0.4, and they don't know whether the graph is a theoretical one or an empirical one.

Moore (2000) show the histogram of 1000 binomial counts (n = 2500, p = 0.6) and the normal density curve that approximates this binomial distribution (see Figure 5.7 on p. 277). But, it is very difficult to follow in Moore's steps, because it needed 2500000 trials!

SUGGESTED MACHINE

We suggest a binomial machine covered 1 to 19 for the trial number n, and 0.001 to 0.999 for the success probability p.

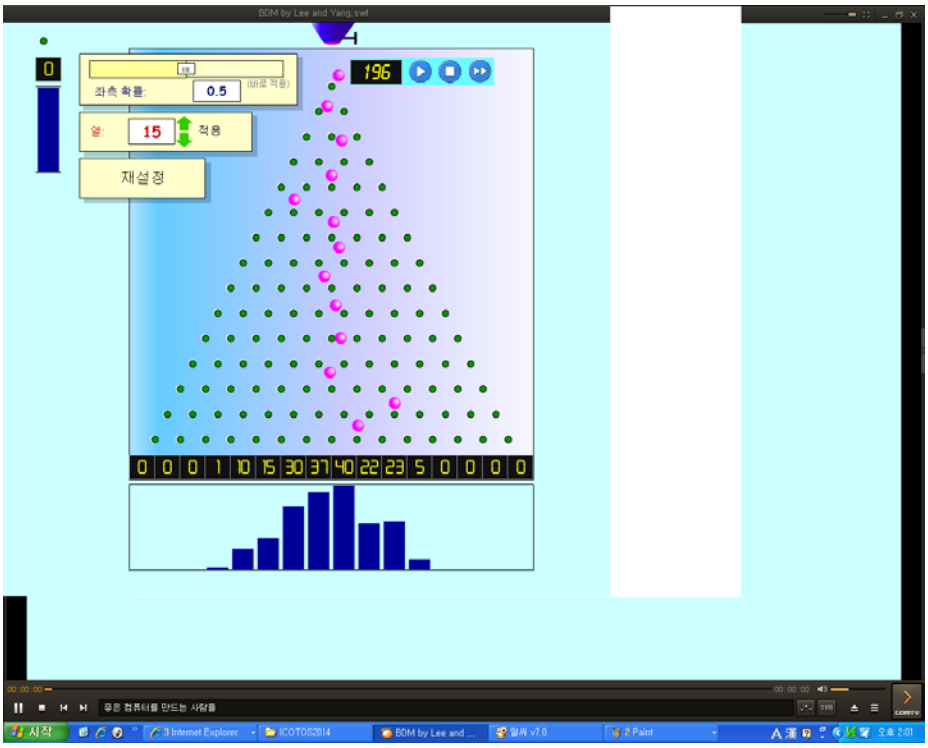
Next 3 figures were created from the machine. The first and second figures are the histogram of 196 counts and 6670 binomial (n = 15, p = 0.5) counts, respectively.

The third figure is the histogram of a combined binomial distribution, that is 200 binomial (n = 15, p = 0.7) counts plus 300 binomial (n = 15, p = 0.3) counts. It can consider a simulator for combined binomial distributions.

FURTHER STUDY

We will improve the machine simulator by playing music!

In K. Makar, B. de Sousa, & R. Gould (Eds.), *Sustainability in statistics education. Proceedings of the Ninth International Conference on Teaching Statistics (ICOTS9, July, 2014), Flagstaff, Arizona, USA.* Voorburg, The Netherlands: International Statistical Institute. iase-web.org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196
좌측 확률:
0.5
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열:
15
적용
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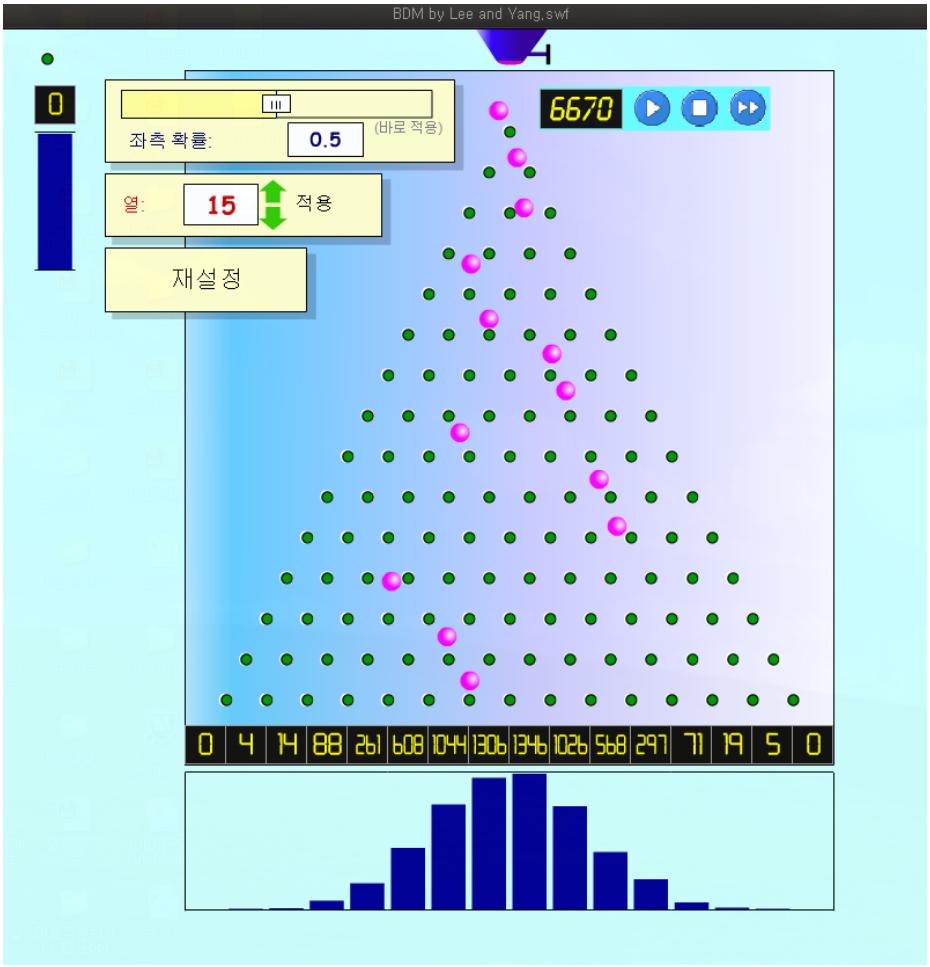
BDM by Lee and Yang.swf
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6670
좌측 확률:
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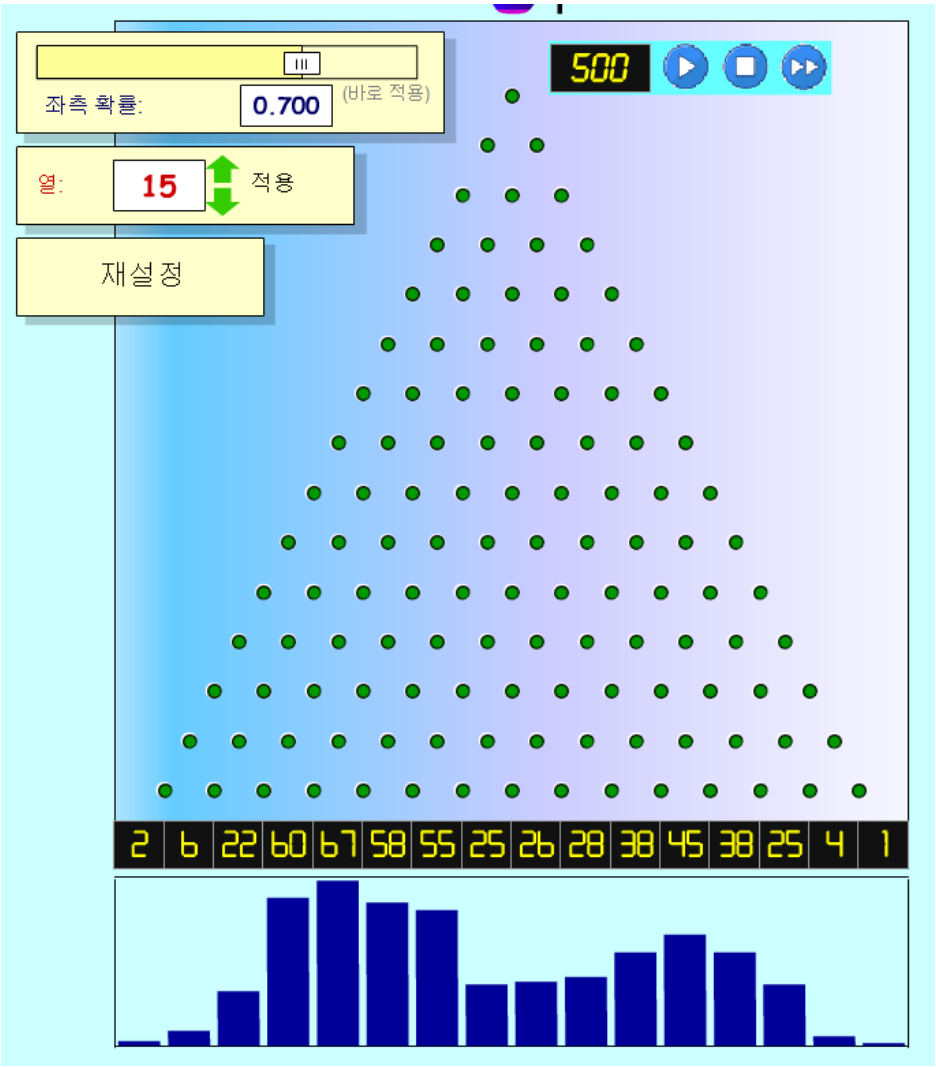

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