BigDeal explained

Introduction

The dealing program for bridge deals BigDeal was introduced in international competition in the year 2000. Very little has changed since the introduction, but here is a short new document to explain principles and operation, describing version 2.0.

A bit of new documentation for a 25 year old program.

What should a dealing program do?

A dealing program falls under the provision of law 6E3, which means it must do the same as thorough manual shuffling.

This means that each deal made must be independent of any other deal and must be random. Each possible bridge deal should occur with equal probability. Meaning any program and/or procedure that makes deals such that they fall under any constraints at all is illegal.

So BigDeal, when producing a set of thirty deals, will make each deal totally separate. This of course means it is possible, although very unlikely, that it will contain ten deals where NS can make slam, and none where EW can do it. When dealing manually it could happen too.

How is each deal made?

As described above, each deal should occur with the same probability. So how many deals are possible? We will skip the math in this document, but there are 53,644,737,765,488,792,839,237,440,000 possible bridge deals. Let us call this number D. To try to describe how big this number is, if all current inhabitants of our planet would make one deal for every second of their life, they have together produced less than one in a billion deals.

BigDeal contains software to convert any number less than D to the corresponding bridge deal. So, the procedure for each deal is simple. Make a random number less than D. Convert it to a bridge deal. Done.

As a very simple example how this works: In the first 25% of numbers the Ace of Spades is with North, in the second with East, then South, then West.

Where are the random numbers coming from?

Computers have the property, good or bad, that when they run a program, it does the same each time. For dealing that is bad. To get around this there is software, called a

Pseudo Random Number Generator or PRNG for short, that makes pseudo-random numbers. Look at the word pseudo. They can only do this if this PRNG is *seeded*, as they call it, with some unpredictable number, the *seed*.

So, let's get an unpredictable number and use it as *seed*. Now you only need to make sure that the PRNG is good enough that players cannot look at deals 1 to 4 and use that information to predict 5. Furthermore, the PRNG needs to generate big numbers, up to this number D. This can only be done if this *seed* is (much) bigger than D.

The PRNG and seed in BigDeal

In BigDeal the PRNG used is a so-called crypto hash, the sort of software that is also used in finances across networks. They are used all the time with banking apps for example. What happens is that something including the *seed* together with a counter (1,2,3,4,5…) is run through the hash, and the numbers produced are used to make new numbers from 0 to D-1.

And these numbers are uniformly distributed, such that the Ace of Spades is really 25% of the time in West.

The value used as input to the crypto hash varies with the version of BigDeal and how you use it. In BigDeal as normally used to make single sets of deals, the operator of the program identifies himself at first use, and this self-chosen identification together with a big number makes the input for the hash. This last number in version 1.2 of BigDeal is made up by using timing of keyboard input of the user. In version 2.0 it is taken from the operating system, using the same mechanism as banking apps.

BigDeal can also be used by the program SquareDeal, making many sets for large tournaments with some extra security stuff. In that case the SquareDeal program makes all the input.

Conclusion

Dealing for bridge on a computer is very well possible, but care must be taken to make sure all deals are equally likely, and unpredictable from other deals. If used properly it is not possible for BigDeal to deal in a biased way.

Full documentation @ Detailed BigDeal documentation

SquareDeal explained

Introduction

Making deals with BigDeal is a good first step. But unfortunately, lots of bridge players still feel that organizers do funny things with the deals. For example, they think that some sets of deals are not used, or that the wildest deals are put in the evening session, or any other conspiracy theory they subscribe to.

The organizer is normally without defense, because all he can say is "*I did not do it*". But this can also be solved. If the organizer can show the deals were outside his control, while keeping them secret from the players until at least the end of the session both organizer and players can be on good terms with each other.

Procedures

Enter SquareDeal. This program allows the organizer to commit to the deals of the tournament before he knows what they will be. How does this work?

The organizer publishes (at least something like two weeks) before the tournament a file containing a description of all the sessions of the tournament. In that file there are two extra pieces of information, a cryptographic secure hash of all the inputs to BigDeal, and a promise to use some unknown future information as extra input. For example, the closing Dow Jones Industrial index of two weeks later. I hope you will understand that the organizer cannot know the value of this at the publishing time.

Someone can make a copy of this file to make sure nothing gets changed. At the end of the tournament the organizer publishes the inputs to BigDeal, which can then be checked against the hash by interested players. Don't worry if you have no clue how this works. Some other player will know, or you can read online documentation.

Conclusion

The combination of BigDeal and SquareDeal will make sure of good random sets, and no accusations against the organizers.

Any questions can be sent to the author:

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Software @ https://github.com/hansvanstaveren/BigDeal

Windows binaries @ Binaries