



## The Lotus Festival

By Kyle Cattani<sup>1</sup>

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Greg Fisher was excited about his latest idea to help the Bloomington Lotus World Music & Arts Festival raise revenue from its popular annual festival. The festival ran each year in a late September week from Wednesday to Saturday and featured a couple dozen bands from all over the world that performed in multiple venues in downtown Bloomington.



Across the day, ticket holders could visit many performances. The Lotus Festival was sponsored by the Lotus education & arts foundation and was named after local musician Lotus Dickey, who had inspired many with his song writing and performance throughout his entire 78-year life. The nonprofit Lotus Education & Arts Foundation was established with a mission to “create opportunities to experience, celebrate, and explore the diversity of the world’s cultures, through music and the arts.”

Festival organizers created the first festival in 1994 which was now celebrating its 20th anniversary. The 2013 festival featured numerous showcase artists including the avant-garde ensemble DakhaBrakha (from Ukraine); a funky mix from Funkadesi that ranged from reggae, to bhangra and Bollywood, to Latin American rhythms, to fat funk grooves, and to territories beyond; the Janusz Prusinowski Trio playing traditional village music from central Poland; and four young women of Kardemimmit playing the Finnish national instrument (the kantele).

Greg’s latest idea was to record highlights from shows on Friday and then press vinyl records overnight to sell to attendees on Saturday. Greg knew that demand for the vinyl records would depend on both the attendance Saturday and of course the percentage of those attending who

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<sup>1</sup> This case was written by Professor Kyle Cattani of the Kelley School of Business, Indiana University as the basis for class discussion rather than to illustrate effective or ineffective handling of an administrative situation. Numbers in the case were adjusted to simplify the case analysis. Copyright © 2014 by Kyle Cattani.

would choose to buy the record. Greg did not have a good feel for what percentage of attendees would choose to make the purchase but guessed that it was likely to be between 5 and 15 percent. Greg was confident in his strategy—and counted on the fact that he could enlist his colleague John Hill for assistance with the analysis needed to determine the optimal quantity to produce.

Greg had good information about attendance. Attendance grew steadily in the first decade from an initial attendance in 1994 of just over 1,000 to nearly 10,000 in 2003. As seen in Table 1, in the second decade, demand was fairly stable on average, with some variation due to economic events (post-recession dips in 2009 and 2010). Demand was also influenced by the weather—in particular, rain tended to reduce attendance as attendees stayed home when rain made the walk from venue to venue less attractive. The most important driver of sales would be Saturday attendance—this would be the day of sales. Note that many (actually a majority) of the attendees came both Friday and Saturday, thus the total attendance is not the sum of the two evenings.

*Table 1: Weather and attendance at the Lotus Festival 2000-2012*

Year	Friday Rain	Saturday Rain	Friday Attendance	Saturday Attendance	Total
2000	1	0	4,876	6,714	7,603
2001	1	0	6,712	8,076	9,610
2002	1	1	5,781	6,012	7,107
2003	0	0	6,676	7,342	9,915
2004	0	0	7,402	8,685	11,025
2005	0	0	6,807	7,684	9,563
2006	0	1	7,823	7,429	9,387
2007	0	0	7,386	8,081	10,158
2008	0	0	6,557	7,296	9,477
2009	1	1	5,846	6,587	7,528
2010	1	0	5,855	7,685	8,570
2011	0	0	7,626	8,203	9,850
2012	0	1	7,309	6,971	9,011

Greg determined that if he were to go forward with the project, setting up sufficiently high-fidelity recording capabilities across the seven venues would require renting equipment that would cost \$2,500. Fortunately, he could enlist the assistance of student volunteers (for free!) to manage the equipment so his total fixed cost would be limited to the \$2,500. Variable costs would depend on how many vinyl records he produced. In particular, each vinyl record produced would cost about \$2 for material and labor. In addition, each record sold would

require that the festival would pay \$5 in royalties to the various artists featured in on the record. (Note that unsold records would incur the \$2 variable cost but would not incur the royalty costs.) Records would be sold at the festival for \$15 each. Greg could not find an easy outlet for any leftover records, so he assumed they would be tossed in the nearest dumpster.

## PART A

Greg decided to use the available data (from 2000 to 2012) to forecast demand for 2013. Running a simple regression on the data for Friday and Saturday attendance (with Friday as the independent variable and Saturday as the dependent variable) led Greg to determine that Saturday attendance could be forecasted as  $3,820 + 0.543575 * \text{Friday Attendance}$ , with a Standard Error of 597.

It was now Friday night. Based on Friday's attendance of 7,982, Greg forecasted a Saturday attendance of 8,159 with a standard error of 597. Greg created a spreadsheet that modelled profit based on the decision (how many records to produce), sales (the minimum of demand and the decision), and the various fixed and variable production costs. Demand was a random variable that was a function of attendance—modelled as a Normally distributed random variable with mean of 8159 and standard deviation of 597—and the “percentage who buy.” Not knowing exactly how to model the distribution describing the “percentage who buy,” Greg decided to model it as a uniform distribution ranging from 0.05 to 0.15. Greg then decided to run a simulation (with 5,000 iterations in each run) for various decisions ranging from 700 to 1,200 (in steps of 100) and compared the average profit for each run to determine the best decision.

Before class, please try to develop a spreadsheet that will determine the profit for any specific attendance and percent who buy.

In class, we will determine the optimal decision (for how many records to burn) by using data tables and random draws for attendance.

## PART B

Greg then ran his results past John Hill. John, ever gracious, complimented Greg on his work so far, but suggested that the model might be refined to consider the weather, especially since there was a 75% chance of rain on Saturday. (Friday had been clear and beautiful.)