



THE UNIVERSITY OF UTAH

Youth Sports Tournaments

Culminating Experience MEM
Todd Easton, Ph.D.

Todd Easton

- B.S. BYU Math, MSOR Stanford, Ph.D ISYE Georgia Tech
- Associate Professor and University Distinguished Teaching Scholar, Industrial and Manufacturing Systems Engineering, Kansas State University
- 2021- Professor (Lecturer) ME U of U
- Wife and four kids
- Enjoy the outdoors, sports, home improvement



I coached for a local soccer club.

- I was in charge of the semiannual tournament.
- It brought in thousands of dollars that helped defer the costs of the players and allow teams to travel to more prestigious tournaments.
- The problem is to create a better tournament experience in the hopes of more teams and more money?

Program of Study (30 hours)

SIME 6500 Management and Leadership for Engineers

SIME 6530 Project Management for Engineers

SIME 6560 Engineering Economic Analysis

SIME 6400 Fundamentals of Systems Engineering

ME EN 6183 Discrete Event Systems Simulation

ME EN 6170 System Engineering and Integration

SIME 6050 Operations Research for Systems

SIME 6000 Analytics for Systems Management

SIME 6450 Design of Production and Service Systems

ME EN 6100 Ergonomics

SIME 6530

- Hosting a tournament is a big project.
- PERT/CPM for the major tasks, which include field rentals, advertising, check in, scheduling, referees, etc.
- Trouble shooting- Kids sports is chaos and the dumbest things occur. You are dealing with volunteers. Some key person is probably going to get in a battle with their child's coach and quit.
- On-time time is most important. Then scope and finally cost.

SIME 6050

- Create an integer program to assign fields, times and game.
 - Sets: Teams (sorted by divisions)
 - U11 and U 12 play on the same fields, but are in different divisions, etc.
 - Fields: the fields available
 - Times: The times for games. These are probably listed as slots with slot 1, slot 2, etc.
 - Decision Variables: $x_{ijft} = 1$ if team i plays team j on field f at time t . 0 else

SIME 6050 Continued

- Each team has to play the correct number of pool games (assume 3)

$$\sum_{j \text{ in teams}, f \text{ in fields}, t \text{ in times}} x_{ijft} = 3 \text{ for all } i$$

- If team i plays j , then j also plays i

$$x_{ijft} = x_{jift} \text{ for all } i, j, f \text{ and } t$$

- At most one game on a field at a time.

$$\sum_{j \text{ in teams}, i \text{ in teams}} x_{ijft} \leq 2 \text{ for all } f \text{ and } t$$

- Other constraints, including coaching constraints, preferred playing times, $x_{iift}=0$, etc.

- Objective is to minimize the number of times that a team plays another team with unequal daily rest

SIME 6560

- An internet hotel managing group contacted me about providing “sponsor hotels.” The cost is \$2,000 for such a service
- The club would get 10% of the teams hotel stays.
- Build a financial model to predict the benefit of entering into this agreement.

SIME 6560 Continued

- Use past data to estimate how many teams are travelling and whether they will need hotel rooms.
- Estimate how many hotel rooms will be taken and the general benefit.
- Build a financial model to predict the benefit of entering into this agreement. Find the expected present worth of entering into this deal.
- There is not really a time value of money calculation. So no need for IRR, ERR, PW, etc. Calculate the financial benefit to the club.

Ethical Considerations

- Should the event be moved to a stay to play event (You have to register for at least 3 hotel rooms to be able to enter the tournament.)
- Will this force poor teams to not enter?
- Should access to quality sporting events be predicated upon wealth?
- From a personal side, I was an unpaid coach, and my goal was to help youth play sports. (I chose not to do the stay to play. Some teams complained that it was difficult to find rooms).

Other classes I could have used

- SIME 6000 Perform analytics on my players, who was on the field for quality shot attempts by both teams.
- SIME 6500 Leading the volunteers and setting policies to have enough volunteers
- SIME 6400 Determining the needs and requirements of the stakeholders so that I actually improve the tournament experience and not just my opinion of the tournament.

Questions