

COMP5920 Scheduling

Coursework Assignment One

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1. Similar scheduling problems found in both CES and Crufts.

- Set up events daily reasonably. With fixed number of events/competitions during the whole show. The organizers prefer not to hold one event per day, because it's waste both time and money. They also wouldn't like to hold too many events/competitions per day as well. How many activities should be scheduled per day is depend. But something unexpected can happen anytime. So reserved some time for backup plan or anything unexpected (e.g. bad weather, facilities break down) is always a wise choice.
- Some of the conferences/competitions may have requirements for the location. For example, the 'AR/VR/XR Top Technology Companies' event may expect the exhibition hall to have electrical supports and enough rooms for the normal use of VR devices and huge screens to give the participants better live experience. For dog show, different kind of competitions also have different space requirements. For instance, 'flyball team' request larger space than freestyle music competition'. In conclusion, people should consider exhibition/competition hall conditions when scheduling.
- Both CES and Crufts are held more than one day, so audiences' accommodations and commutes arrangement can be another scheduling problem. For example, when and where the shuttles should be assigned? Are there enough hotels to provide residences for the audiences. Similar scheduling problem, like if there are enough restrooms, refectories and other facilities near the exhibition area are also important.
- There are many exhibition buildings or competition halls in both CES and Crufts. People may need to across the whole show area to get to another conference which may located in the opposite side of the area after attending one conference. This can always be a serious scheduling problem. For example, in CES, it's a long way to get to Westgate from Mandalay. In another words, audiences always want to make use of their time in the event rather then waste it on the way to the event. So how to minimize the distant between halls or if it's necessary to arrange shuttles can be another scheduling problems.
- Because both CES as well as the Crufts are huge events, there are many requirements from audiences and organizers. And sometimes, these requirements are conflicted, which means there has to be a trade-off. For example, in CES, 'Printed Electronics' and 'When Will Advanced Automotive Tech Pay Off' take place at the same time. For Crufts, 'Resorts World Arena Programme' and 'GCDS Ring' also happen at the same time. So people need to determine the priority of these conferences/competitions and the priority of other possible conflicts can be another scheduling problems.

- Both CES and Crufts have sponsors. Like CNN, TechCrunch, etc for CES, Royal Canin, Fish4Dogs, etc for Crufts. And these sponsors are not invest their money for nothing. As the organizers point of view, it's also important to pick suitable timing to advertise their supporting partners, like promoting their sponsors at the end of each conference.

2. CES specific scheduling problems

- The time interval between each conference should be defined carefully. During this time interval, audiences can walk from one conference to another. As for exhibitor, they can use this time to set up equipment to get ready for the next event. And how long should we defined this time period is crucial. If the time interval is too long, it could cause the whole event inefficiency, audiences may get bored when they wait too long for the conference begin. On the contrast, if the time period is too short, audiences may not be able to get to the conference in time.
- CES is not only about conference or meeting, but also has up to 3 large exhibition halls. And there are massive booths inside the hall for demonstrating. Therefore, how to allocate place for each booths could be another scheduling problem. And this problem could also be associated with the priority problem. Because organizers would like to arrange popular or attractive things in the conspicuous place of the exhibition hall.
- Some of the conferences in CES are in live stream, like 'CES 2020 Trends to Watch'. Live stream means people can watch this conference wherever they want. Thus, this kind of conferences have profound influence and play an significant role in CES. Organizers want people not only in the conference room but also in different places to watch these. Therefore, how to arrange live stream conference is important. For example, live stream should be in held in a time that everyone is not that busy in a day.
- CES are more about high technology, so many conferences and exhibitions are about high technology demonstrations. This also means that these events have goods shipping requirements. Like VR equipment, drone, robotics, etc. So how to arrange goods transportation is also a noteworthy scheduling problem.

3. Crufts specific scheduling problems

- As for 'athletes' in cruft competition, they needs to get familiar with surroundings as soon as possible, so that they can perform better in the game. And this requires competition halls for each game stay the same. For example, the 'crufts team' semi-finals and finals should have maximum possible to be held in the same location. But it's impossible to hold all of the games in one location. So that is a scheduling or trade-off problem to be solved in the Crufts.
- Another issue to keep the dog participants have better performance is that each dog participants shouldn't attend too many games in a day. For example, a dog should never attend 'flyball team' , 'jumping' 'music competition', etc in the same day. If not, this could lead the dog to be exhausted, and not doing so well in the game. This also could cause unfair and bored the audiences due to bad performance in the game. Therefore, arrange each dogs' schedule appropriately is also another scheduling problem.

- For Crufts, arrange schedule is not only about dogs and locations, one particular thing about Crufts is that there are one or more judges in almost every game. So crew scheduling, avoid conflict and too many games to judge in one day is also important. For example, judge Mr C Hastings may not want to judge 'spaniel' competition in two different rings at the same time.
- For Crufts, the arrangement of accommodation and travel is different from other events. Because Crufts is more like a 'Dog Olympics'. At that time, thousands of dogs from all over the world will come to Birmingham. And the procedures for pet flying is quite complicated, also pets are forbidden from entering most of the hotels. So allocate specific staffs for consulting, helping participants book hotels is important. Also organizers should draw up a flexible schedule just in case something above goes wrong.

4. Comparing the scale and complexity of scheduling between CES and Crufts.

- Both CES and Crufts attracts hundreds thousands of visitor each year. 160,000 visitors and over 20,000 competitors for Crufts. 172,212 for CES, which including media, industry, exhibitor personnel. Such huge number of participants means both events are complicated to schedule.
- But when I look in details, there are differences in scale between CES and Crufts. For Crufts, there are over 120 competitions everyday. And each of these competition are quite small scale. Some of them are last for only 40 minutes and some of them only require for small space for the games. As for CES, they have up to 80 events per day, which is a huge amount, but no as many as Crufts. And each conference takes places in central hall, theater, etc, which is quite more formal and larger scale.
- When it comes to complexity, CES are more about human beings, which means people are more likely to follow schedule and instructions. As for Crufts, I believe these dogs are well-trained, but dogs can be effected by many things, sometimes they are likely to lose control. Thus, Crufts needs a more flexible and complexity schedule to deal with these situations.

Also Crufts mainly have 5 halls to hold different competition. As for CES, there are more than 40,000 booths and 20 large scale conference rooms. All in all, to allocate so many exhibition spaces is fairly complex.

Reference:

- [1] Ernst, A., Singh, G. and Weiskircher, R. 2008. *Scheduling Meetings at Trade Events with Complex Preferences* CSIRO Mathematical and Information Sciences. ICAPS, 2008.
- [2] Potvin, J.-Y. and Rousseau, J.-M. 1993. A parallel route building algorithm for the vehicle routing and scheduling problem with time windows. *European Journal of Operational Research*. **66**(3), pp.331–340.
- [3] Nemhauser, G.L. and Trick, M.A. 1998. Scheduling A Major College Basketball Conference. *Operations Research*. **46**(1), pp.1–8.
- [4] Russell, R.A. and Urban, T.L. 2006. A constraint programming approach to the multiple-venue, sport-scheduling problem. *Computers & Operations Research*. **33**(7), pp.1895–1906.
- [5] Nearchou, A.C. 2008. A differential evolution approach for the common due date early/tardy job scheduling problem. *Computers & Operations Research*. **35**(4), pp.1329–1343.
- [6] Nudtasomboon, N. and Randhawa, S.U. 1997. Resource-constrained project scheduling with renewable and non-renewable resources and time-resource tradeoffs. *Computers & Industrial Engineering*. **32**(1), pp.227–242.