Touring Disney – Faster, Faster!

The growth of the TDTSP algorithm and code

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Optimality

• Estimated Bitcoin hash rate = $10^{19}$ operations a second
• $20! = 2.4 \times 10^{18}$, less than a second
• $21!$: one second
• $22!$: less than 2 minutes
• $23!$: 43 minutes
• $24!$: 17 hours
• $25!$: 17 days
• $26!$: 460 days

• $29!$: 28018 years
Ok, time to go home
How to make a good guess

• Genetic algorithm
• Initialize a ‘population’ of tours
• For some number of generations:
  • Pick one or two ‘parent’ tours
  • Pick an operation and use it to make a ‘child’ tour
  • If the child tour is fit enough, it gets included in the population and bumps another tour out
• Output the best tour
• Move It! Shake It! Celebrate It! Street Party
• Main Street Electrical Parade FP+
• Wishes nighttime spectacular FP+
• Celebrate the Magic
• Disney Festival of Fantasy Parade FP+

Pick up a Times Guide for more information.

Special Considerations for Attractions

Safety: Please abide by all safety warnings and notices. Supervise children at all times. Children under age 10 years must be accompanied by a person age 16 years or older.

For your safety while on attractions, remain seated with hands, arms, feet and legs inside the vehicle. Supervise children.

Physical considerations on designated attractions:
Disease, fever, flu, cold, respiratory problems, heart condition, or other conditions that could be aggravated by this activity. See health care provider before activity.

LEGEND

Symbols & Amenities

Restrooms

Accessible F

Companion F

First Aid Post

Guest Relations

ATM

Press Kiosk

Automated Teller

Smoking Area

Baby Care Center

Complimentary Wi-Fi

Wi-Fi is available in most areas. Some attractions and shows may have limited availability.
But wait...

- TD = Time Dependent
- TDTSP
- Takes more computation to determine fitness
- Using time dependency we can find tours that see everything in Magic Kingdom in one day*

* With Extra Magic Hours
But wait... (2)

- FastPasses
  - At most three attractions
  - Same park
  - Tiers (Epcot and HS)
  - No overlap
- User friendly

Want to make selections for a new day?

New FastPass+
Now with Time Windows!

A wholesome part of your family vacation!
Cases

- I’ve already selected my FastPasses!
- Disney is offering me some sets of FastPasses.
- I want FastPasses for these rides!
- What’s a FastPass?
I’ve already picked FastPasses!

- Population-wide FastPasses
  - Change the wait times for all tours in the population
  - Over time, the tours that fit the FastPasses (and are faster) become more common
Changes

• OneShift
  • ‘Shifts’ the parent’s rides repeatedly
  • Tries to fit all rides with FastPasses into their allotted time slots
  • Problem is as hard as the TSP
  • Can only make a child if it is successful
  • Depth : 4
    • success Rate : 80%
• Not that useful
Disney gave me four options for FastPasses!

• Population-wide FastPass groups
  • New tours are forced to have one of the population’s groups
  • May the best group win!
Changes

- Initialization stage of populations
  - Give each new tour a random group
- RandomFastPassGroup
  - Make a child tour with the same list of rides as the parent tour
  - Pick a random fast pass group and give it to the child tour
I want FastPasses for these rides, but I don’t care when

- Move FastPasses around
  - Start with population-wide FastPasses
  - Let them change times
- Fake rides that are given all day FastPasses
  - Mimic a real ride, and can replace them
  - Specified when you start a new population of tours
Changes

- MatchFastPassesToRides
  - Similar to OneShift
  - Shift FastPass times rather than arrival times
- ‘Fake’ nodes always get FastPass wait times
  - Doubles the number of rides you ‘could’ see
Disney has FastPasses?!?

• Let the algorithm pick FastPasses for you
• New operations that change a tours FastPasses
• FastPass constraints
  • Three per tour (including all-day-fast-pass rides)
  • No overlapping times
  • Tiers in some parks (Epcot and Hollywood Studios)
  • These may still give invalid FastPasses
Changes

• New Operations:
  • addFastPassWorstContrarian
  • addFastPassWorstWait
  • MatchFastPassesToRides
  • randomFastPassRideChange
  • randomFastPassTimeChange
  • AverageFastPassesCross
  • DuplicateFastPassesCross
Other improvements

• New Operations:
  • Initialize Interval
  • Super LKTD

• Partial tours and duplicated rides
  • Issues in some old operators
  • PathRelink, Cycle Cross

• Bug Fixes
  • Edge Recombination
  • Merge Cross?
How can I find a good tour?

• I VERY SERIOUSLY recommend looking at touringPlans.com; we get our data from them
• They also have cool things like a crowd calendar, and they can help find the cheapest ticket package
• Take the Disney MayX, you’ll get to use this application!
Demo
I don’t want to download anything, just tell me tips

• If you think a ride will have a big wait time, see it either in the first hour or two of the day, or between 2:45 and 3:45.
  • Unless it is a new ride that was just built, in which case you MUST see it in the morning to have a reasonable wait time.
• Don’t see Peter Pan in the afternoon. Just don’t.
• If you want to finish as fast as possible, don’t be afraid to walk across the park more than once. 20 min of walking can often save 30 min of waiting.
• Pick some big rides to see early in the day, and don’t waste a FastPass on them that early.
• Good choices for FastPasses in MK:
  • Seven Dwarfs, Peter Pan, Space Mountain, Winnie The Pooh
Acknowledgements

• Professors:
  • Liz Bouzarth
  • Kevin Hutson

• Other:
  • Len Testa, President of TouringPlans.com, coauthor of *The Unofficial Guide to Walt Disney World*
  • Rahul Isaac