Routing (and Route Planning)

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State Of The Map Conference
Manchester, 15 July 2007

Agenda

- What is Routing, Route Planning?
- Algorithms
- Data
- Existing Applications
- Future Development

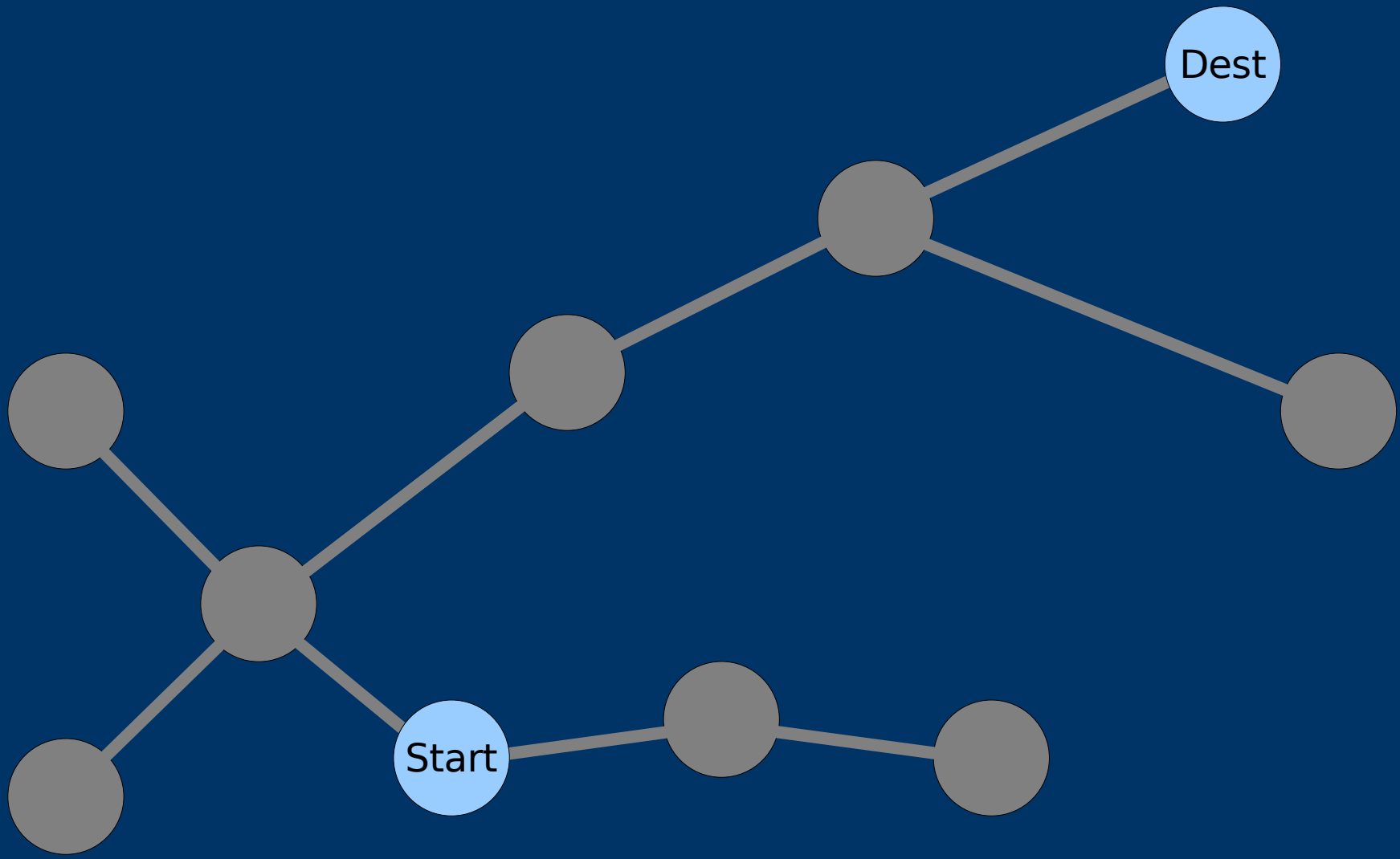
Routing

- user needs instant response
- non-interactive, “just work”
- start from any GPS position
- any result as long as you get there

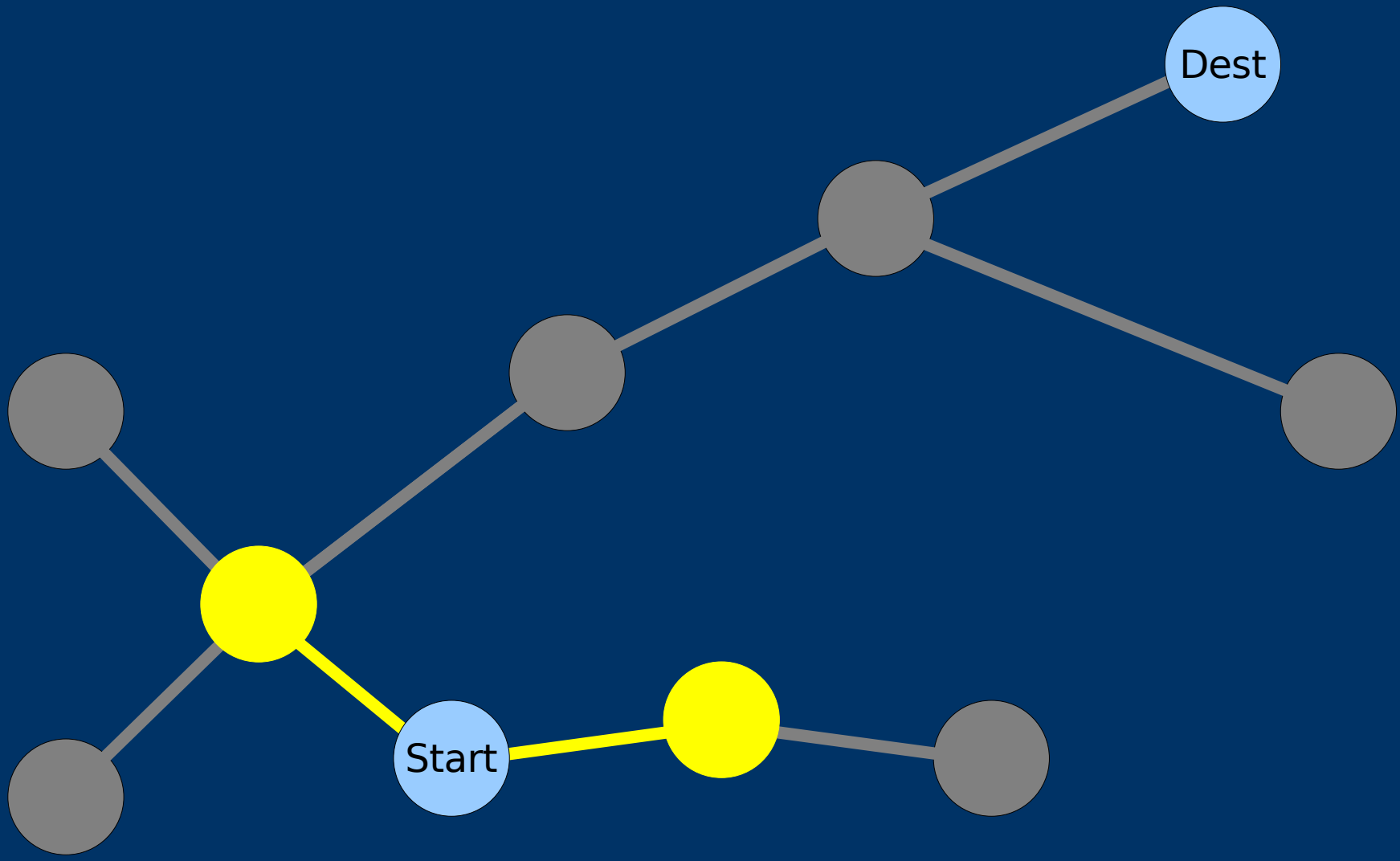
Route Planning

- user has time to wait
- interactive, “tune and tweak”
- start from well-defined address
- effort to find best result

Algorithms: Dijkstra



Algorithms: Dijkstra



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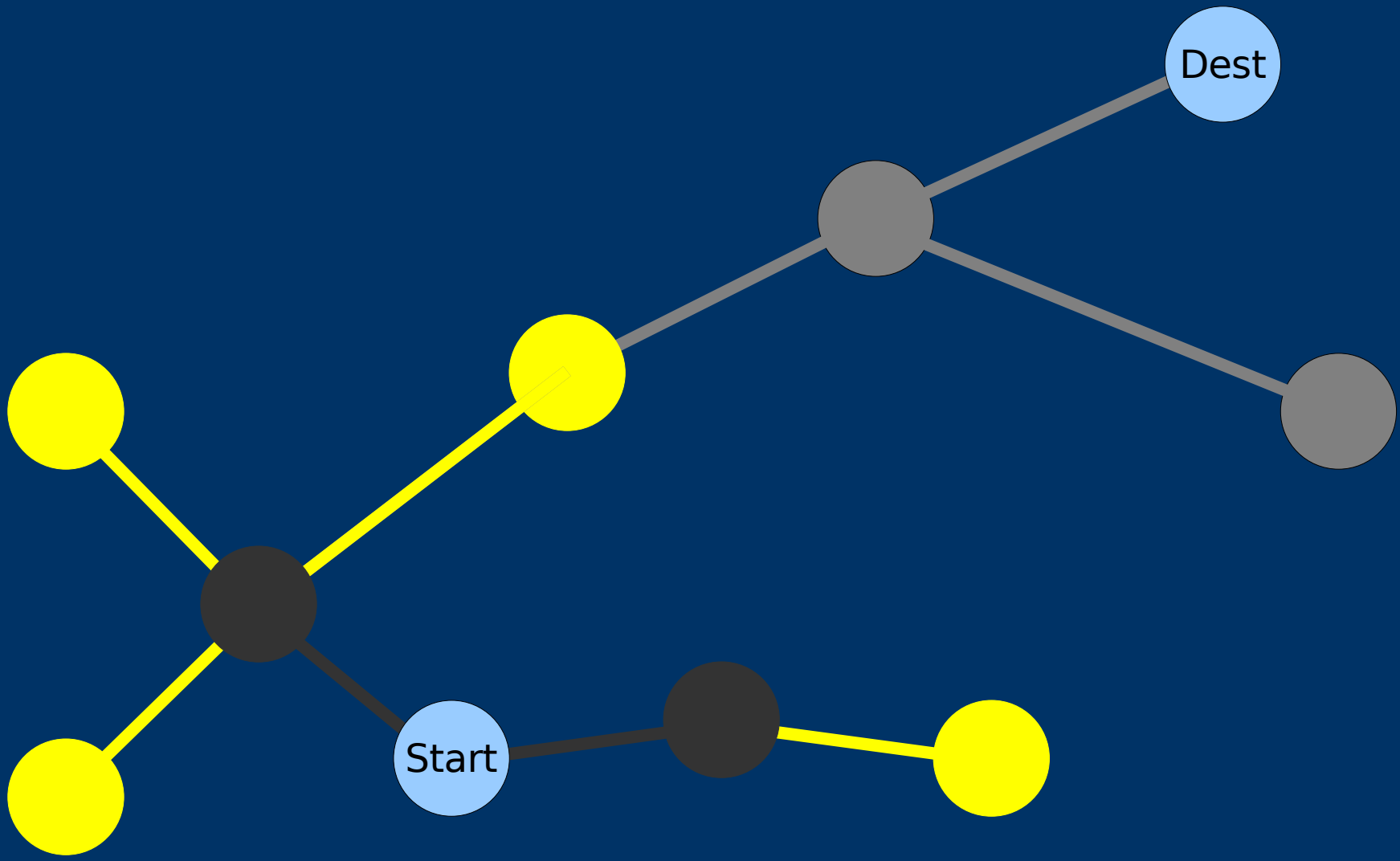

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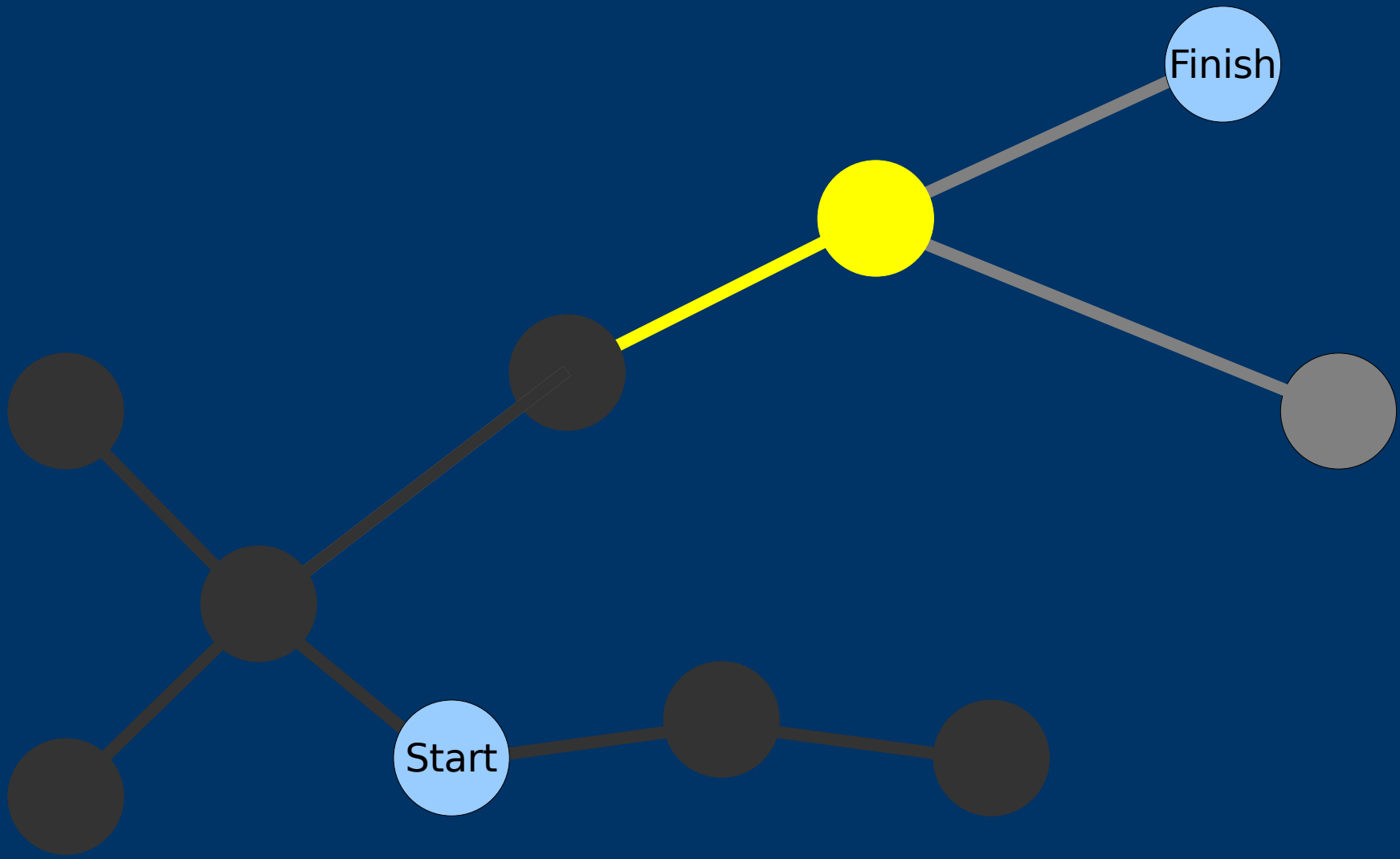

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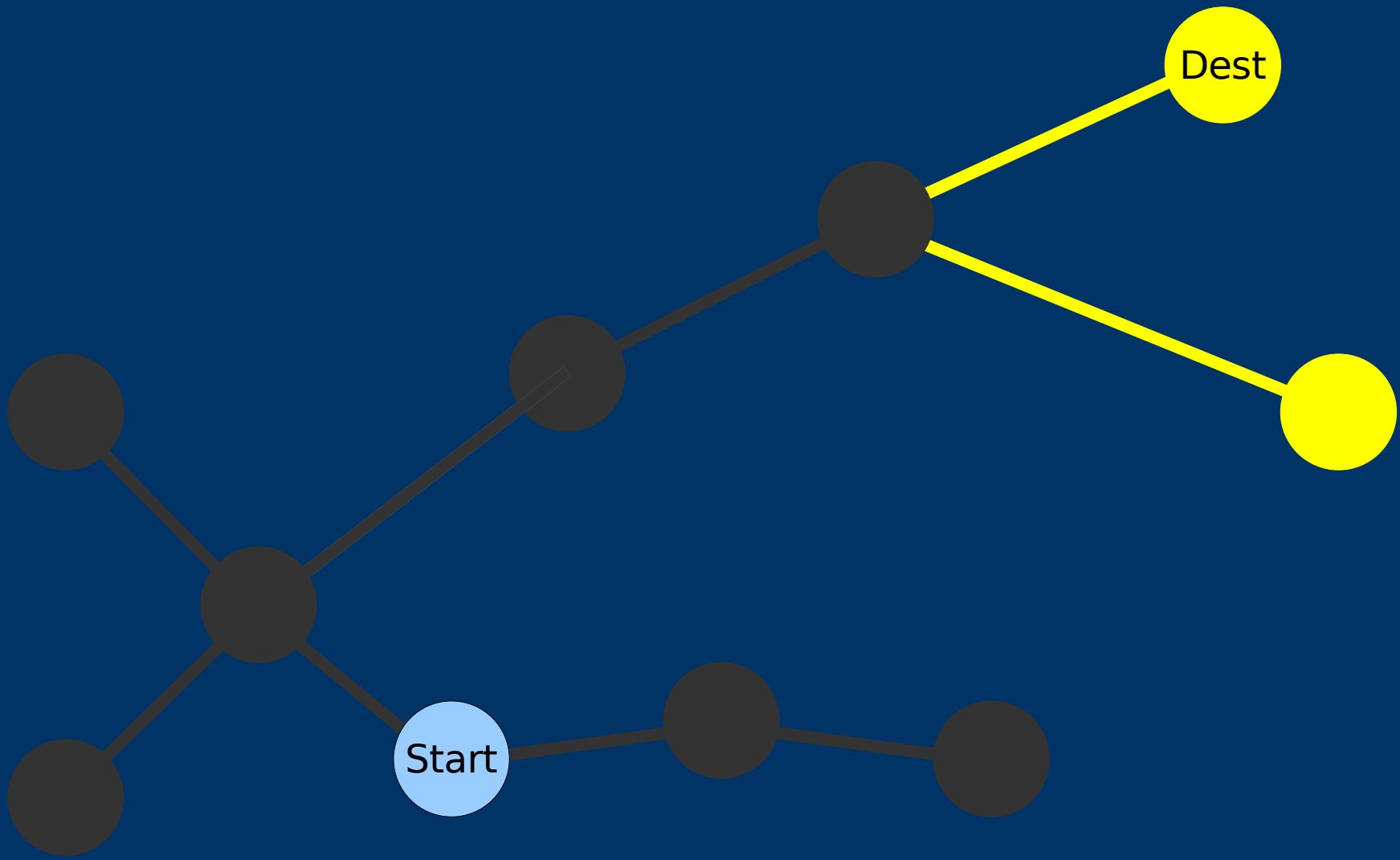

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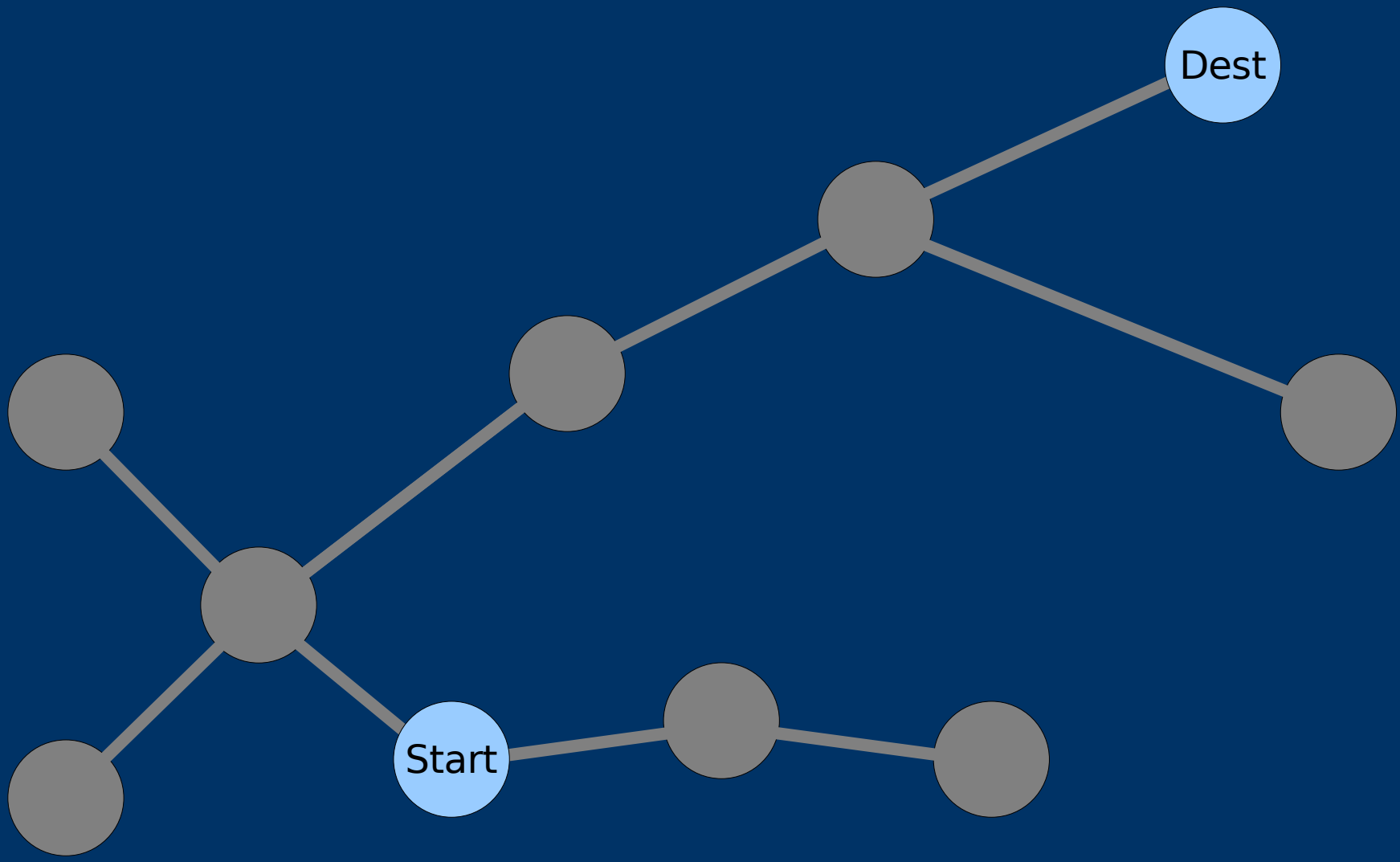

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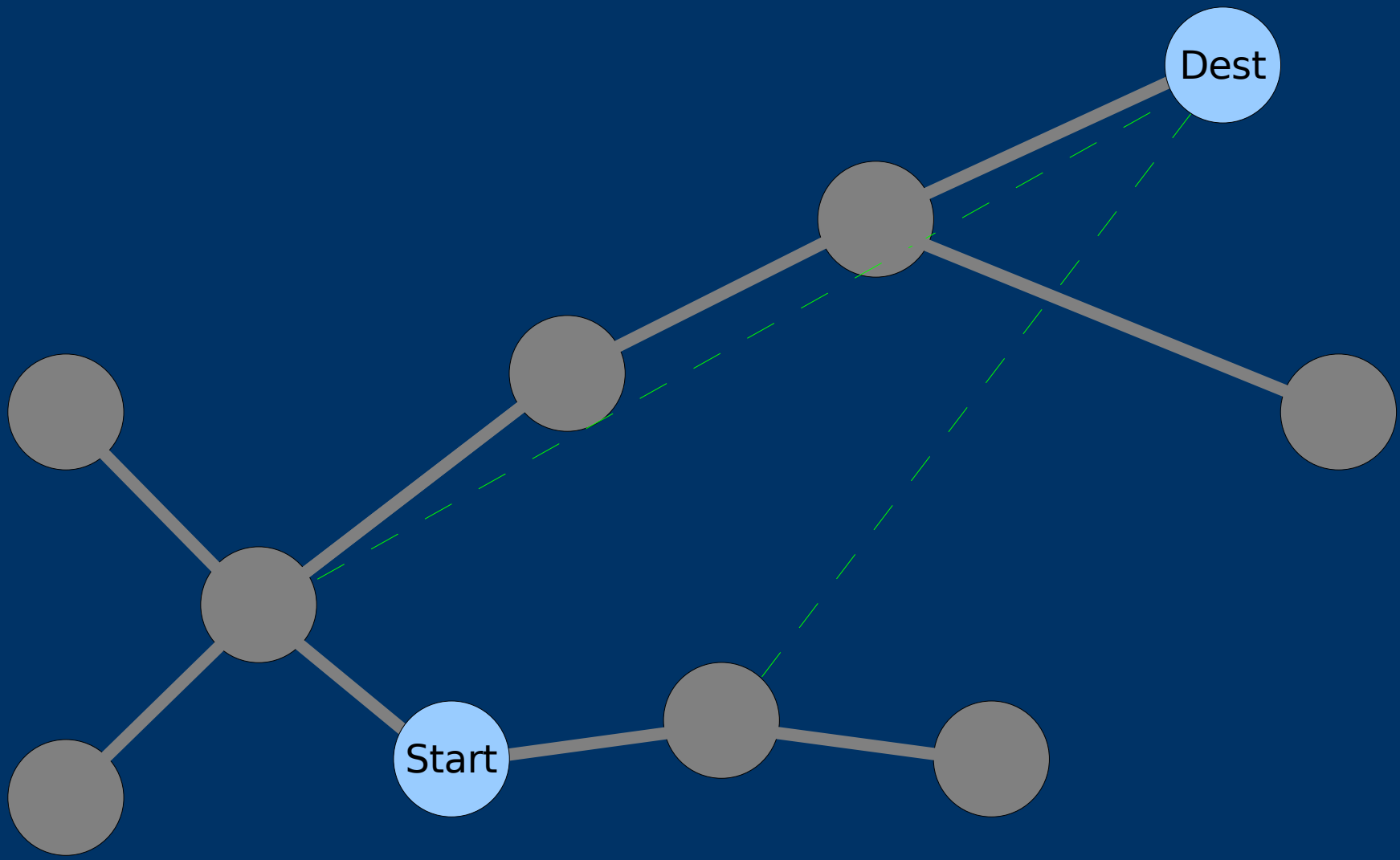

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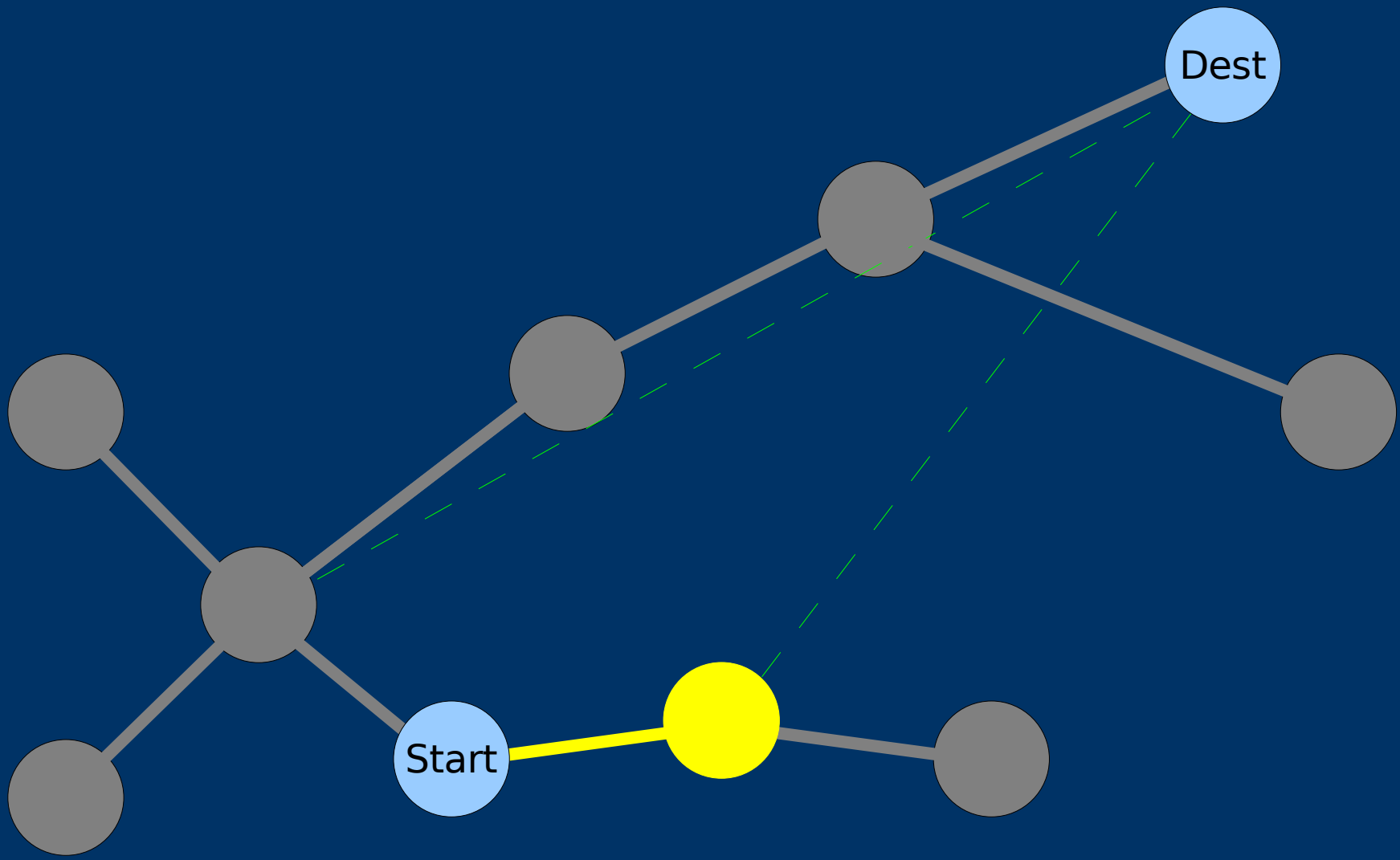

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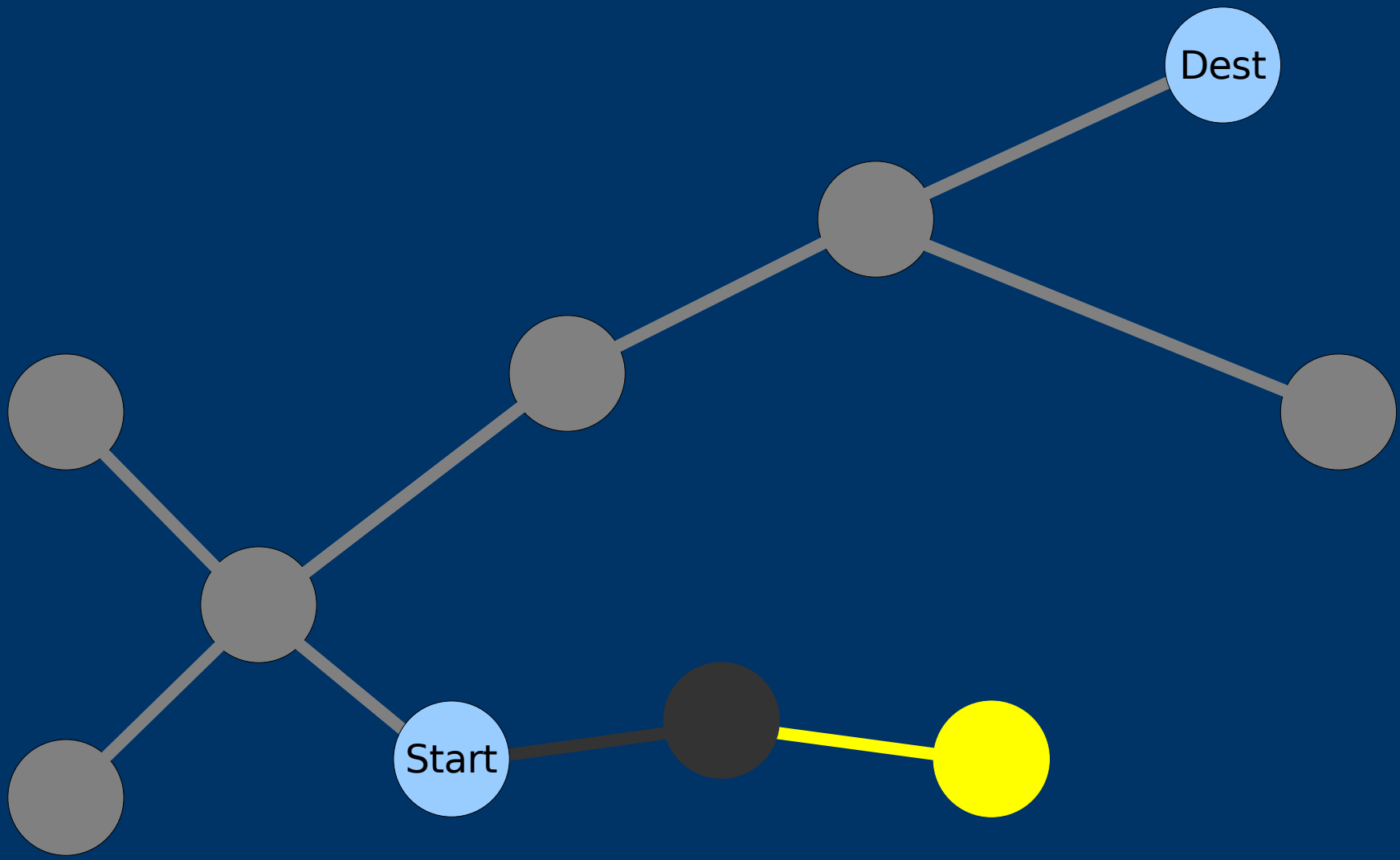

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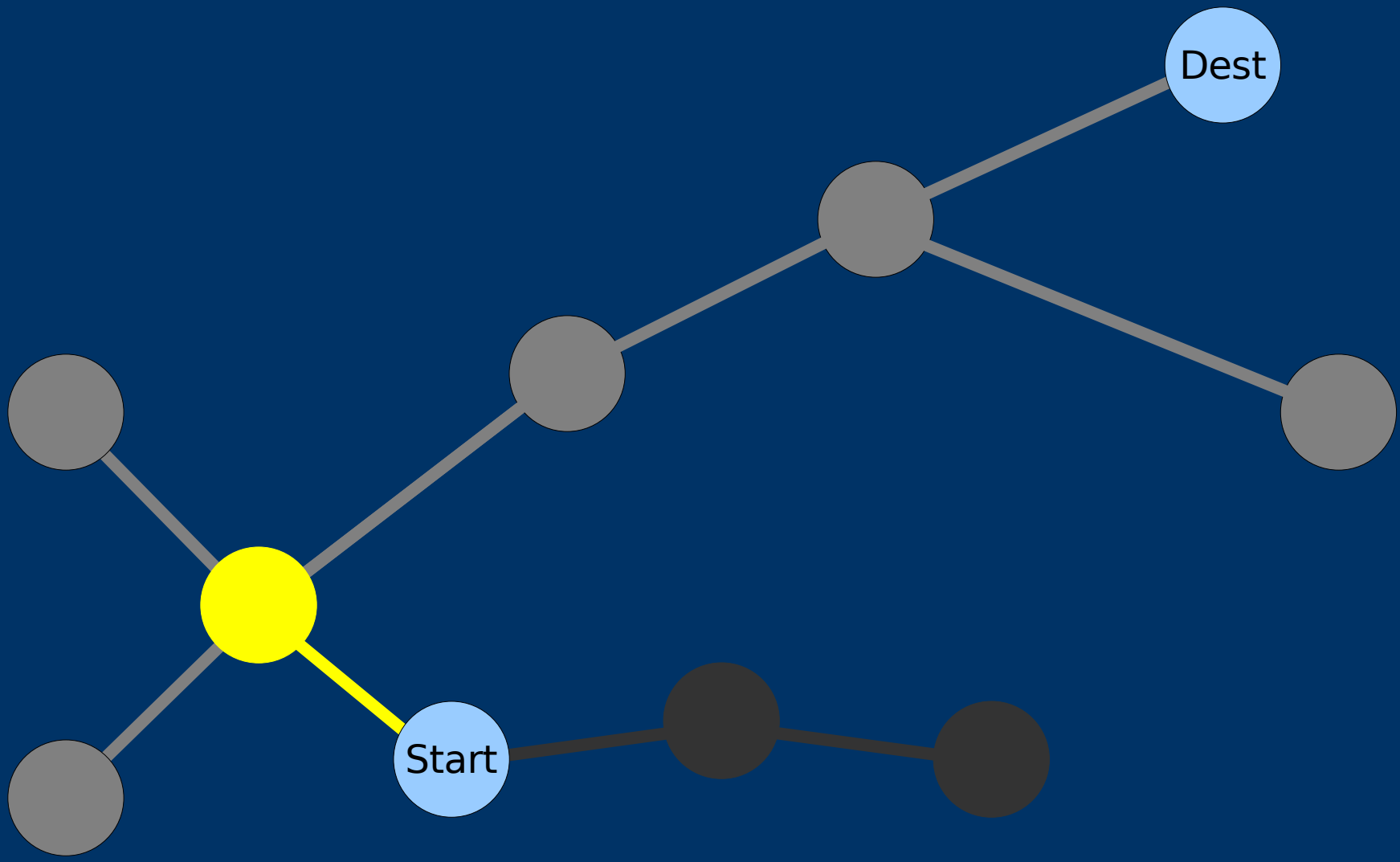

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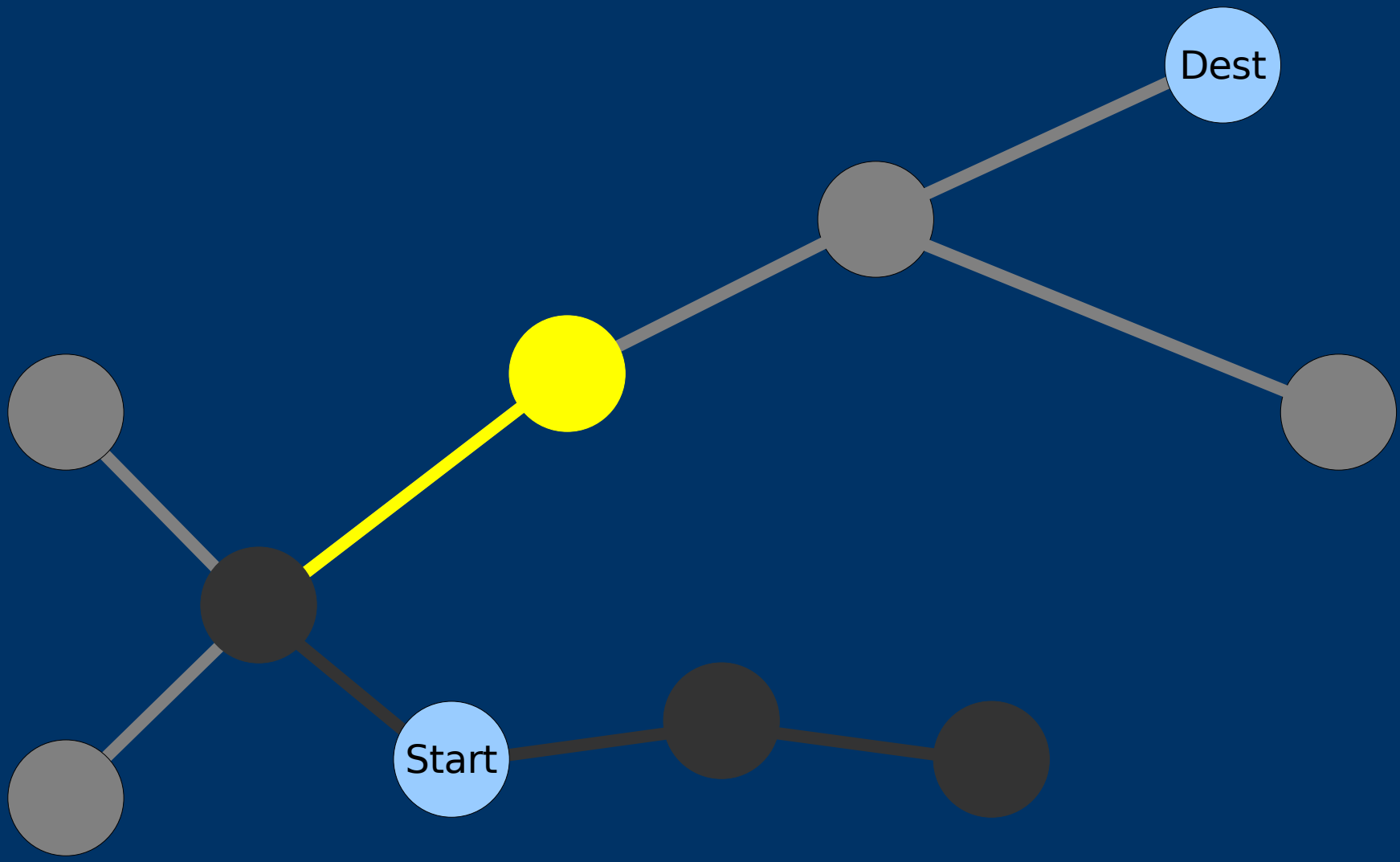

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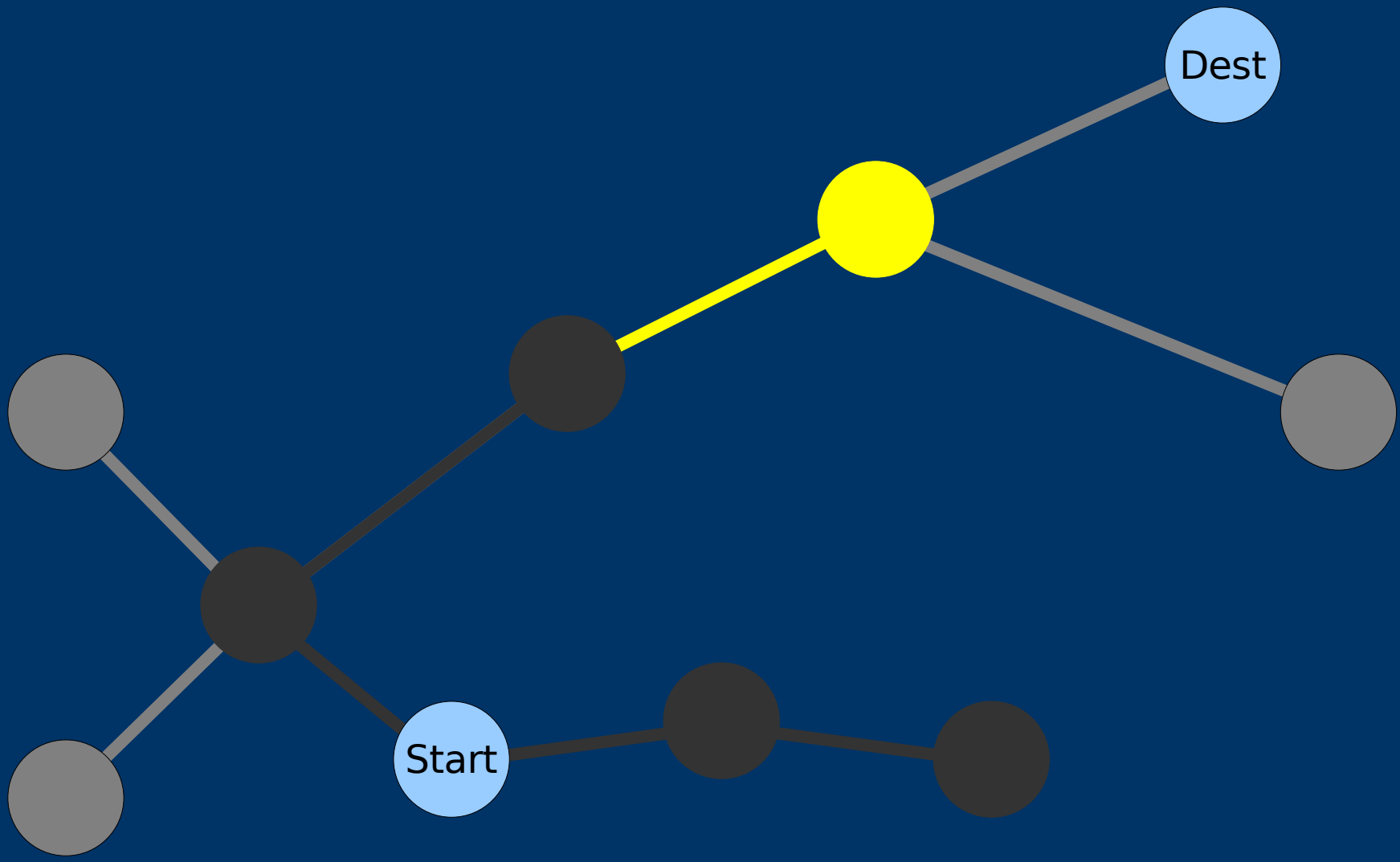

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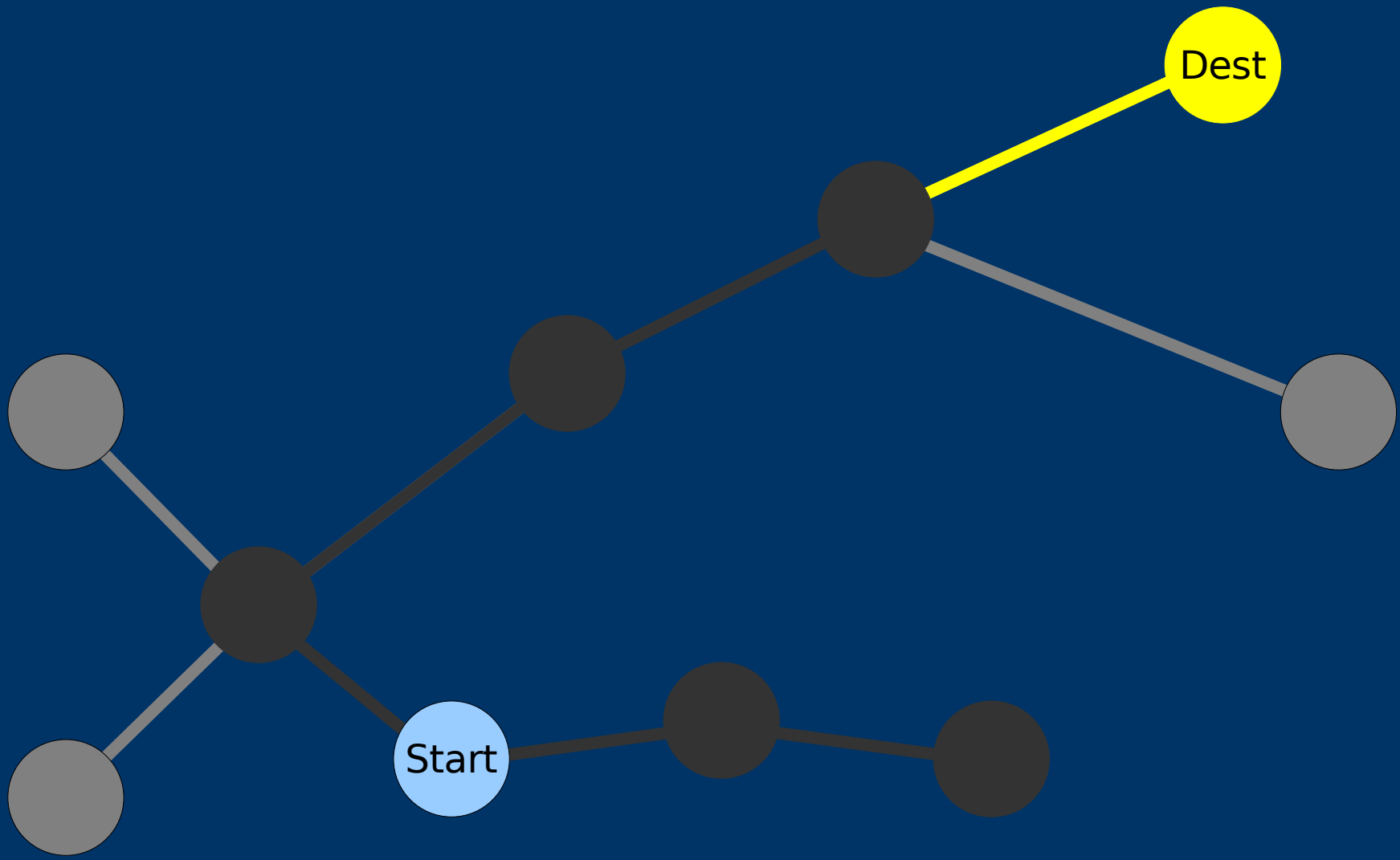


Data: Travel Restrictions

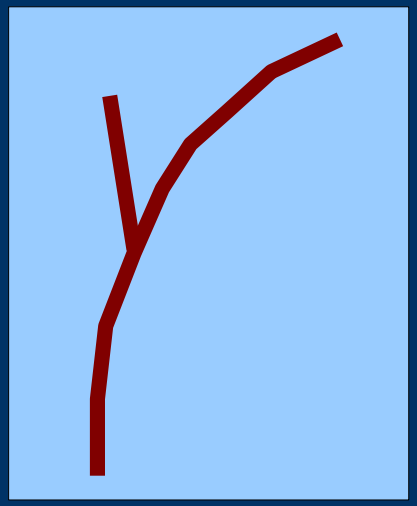
- time (“road closed 22-8h”)
- vehicle type (“no HGVs”)
- no through traffic
- travel direction (oneway)
- turn restrictions

Data: Speed

- road type (motorway, trunk, primary, secondary, unclassified)
- speed limit (maxspeed)
- expected delays, average speeds – possibly forecast for date of travel!

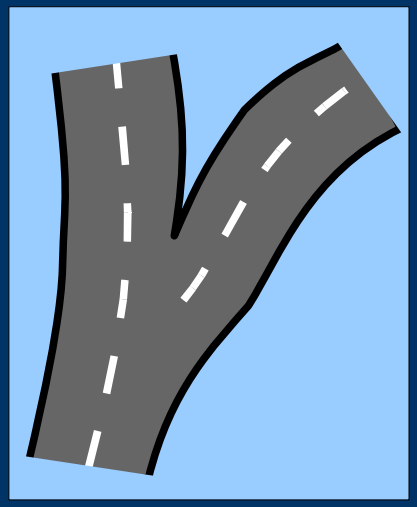
Data: Signposting

- “follow A82 towards Crianlarich”
- house numbers
- road layout



on the map:
“turn left onto...”

but, on
the ground:
“continue on...”

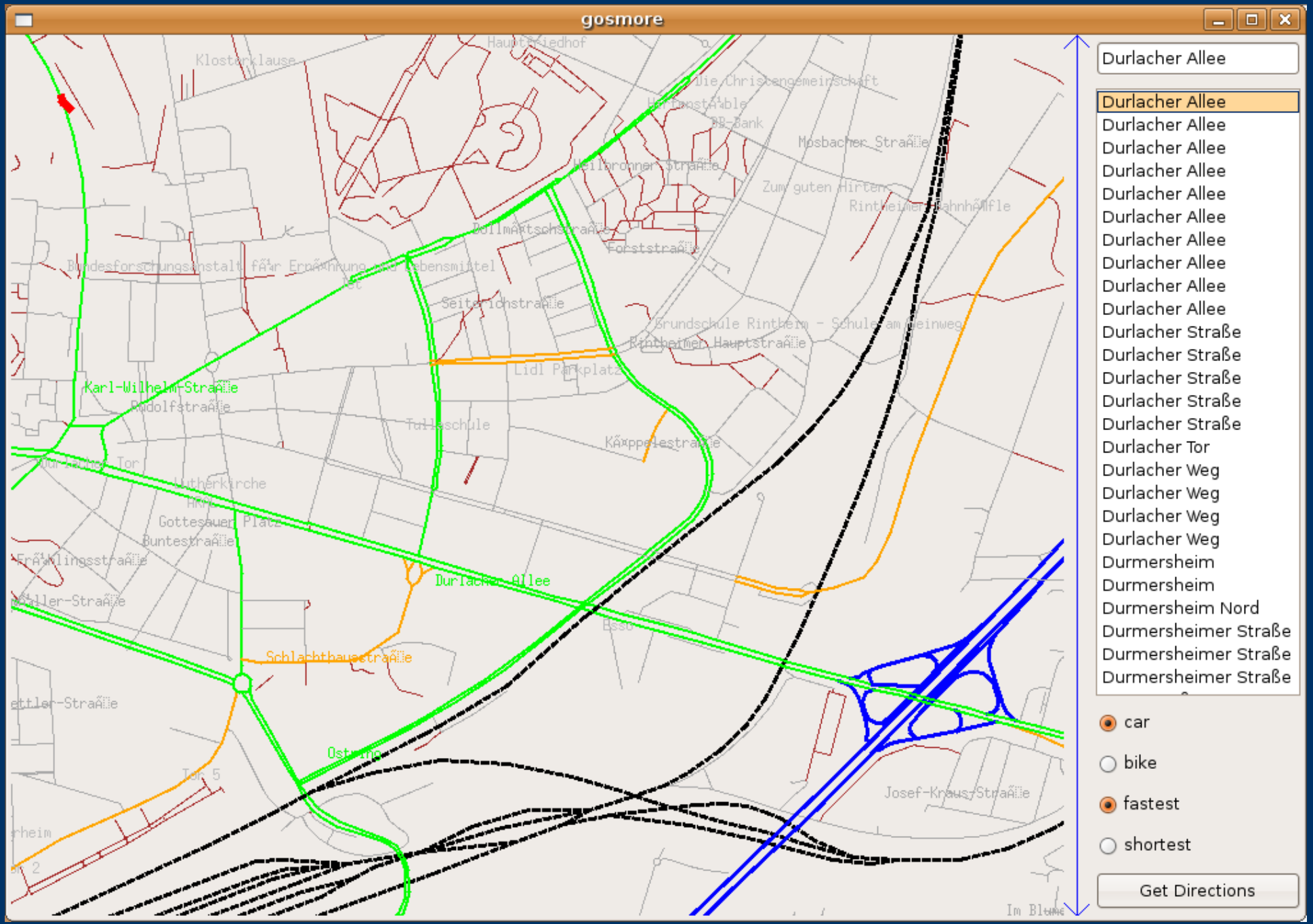


Data: Problems

- level crossings (intersecting ways) – forgotten bridge/tunnel or intersection?
- data model has no relationships, required for turn restrictions, signposting
- level of detail (walkway along the road or separate footpath, etc.)

gosmore

- C++ application by Nic Roets
- planet browser, name finder, router
- 1,200 lines of C++ code
- small memory footprint (256 MB for full planet file)
- Linux only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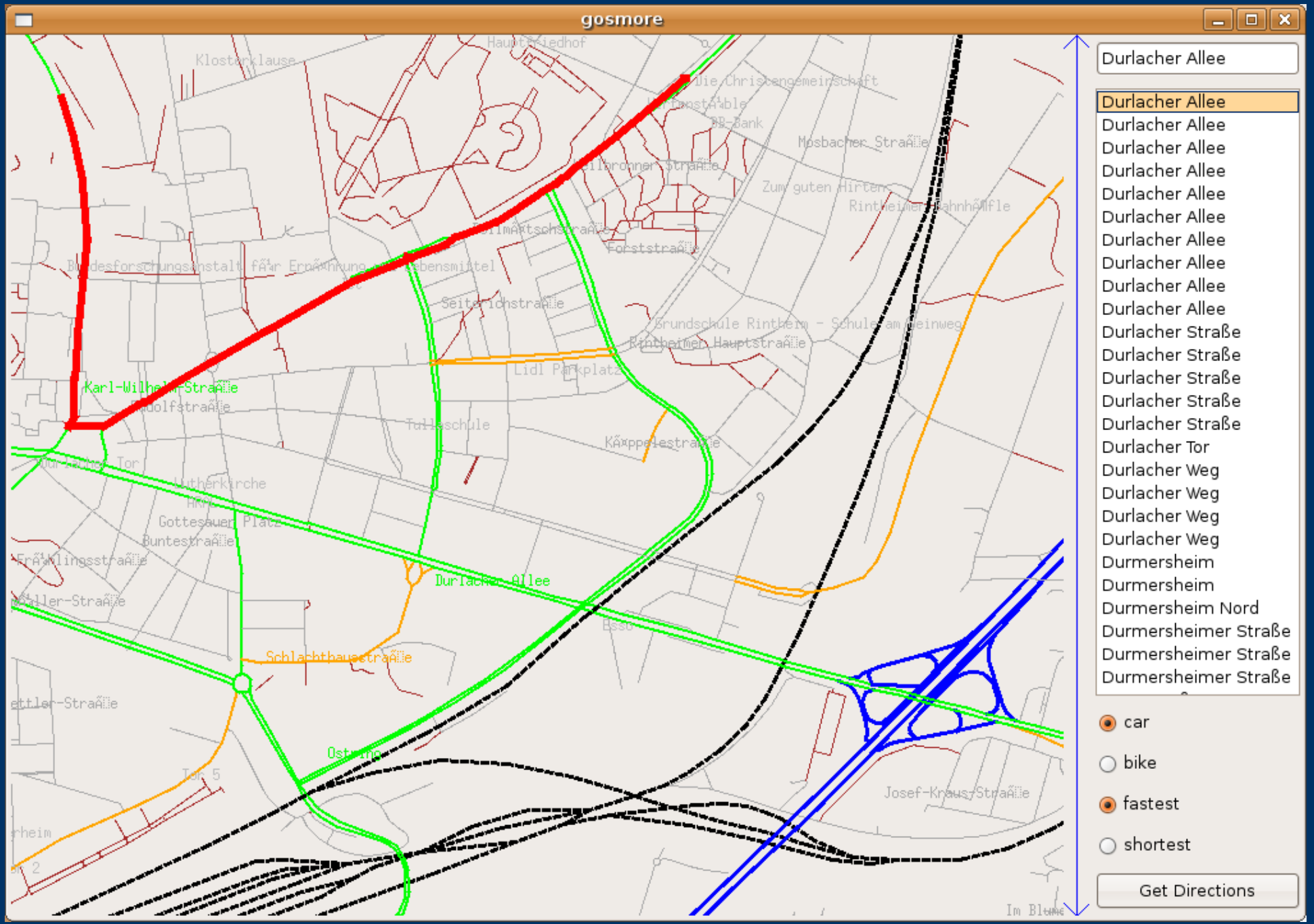
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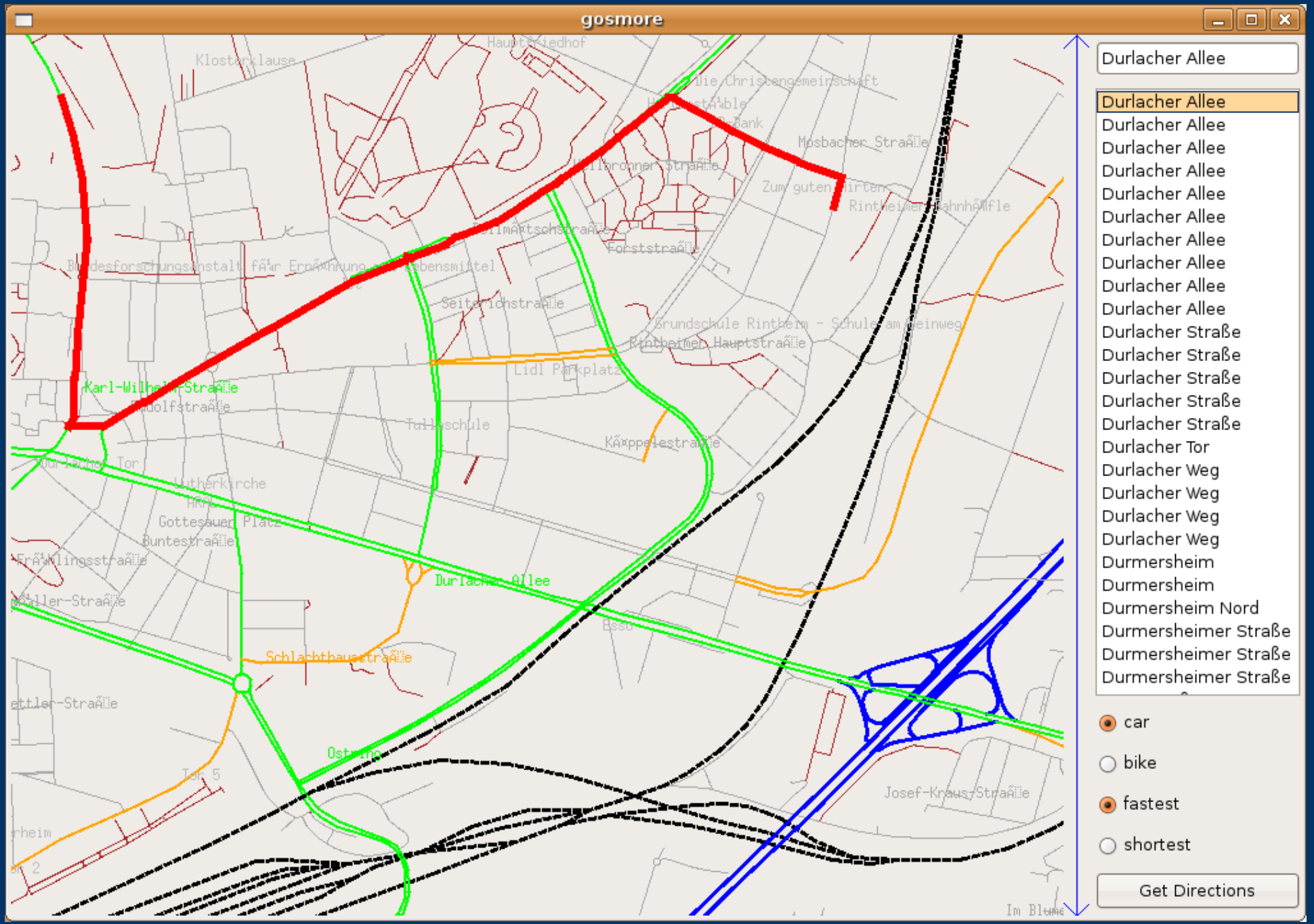
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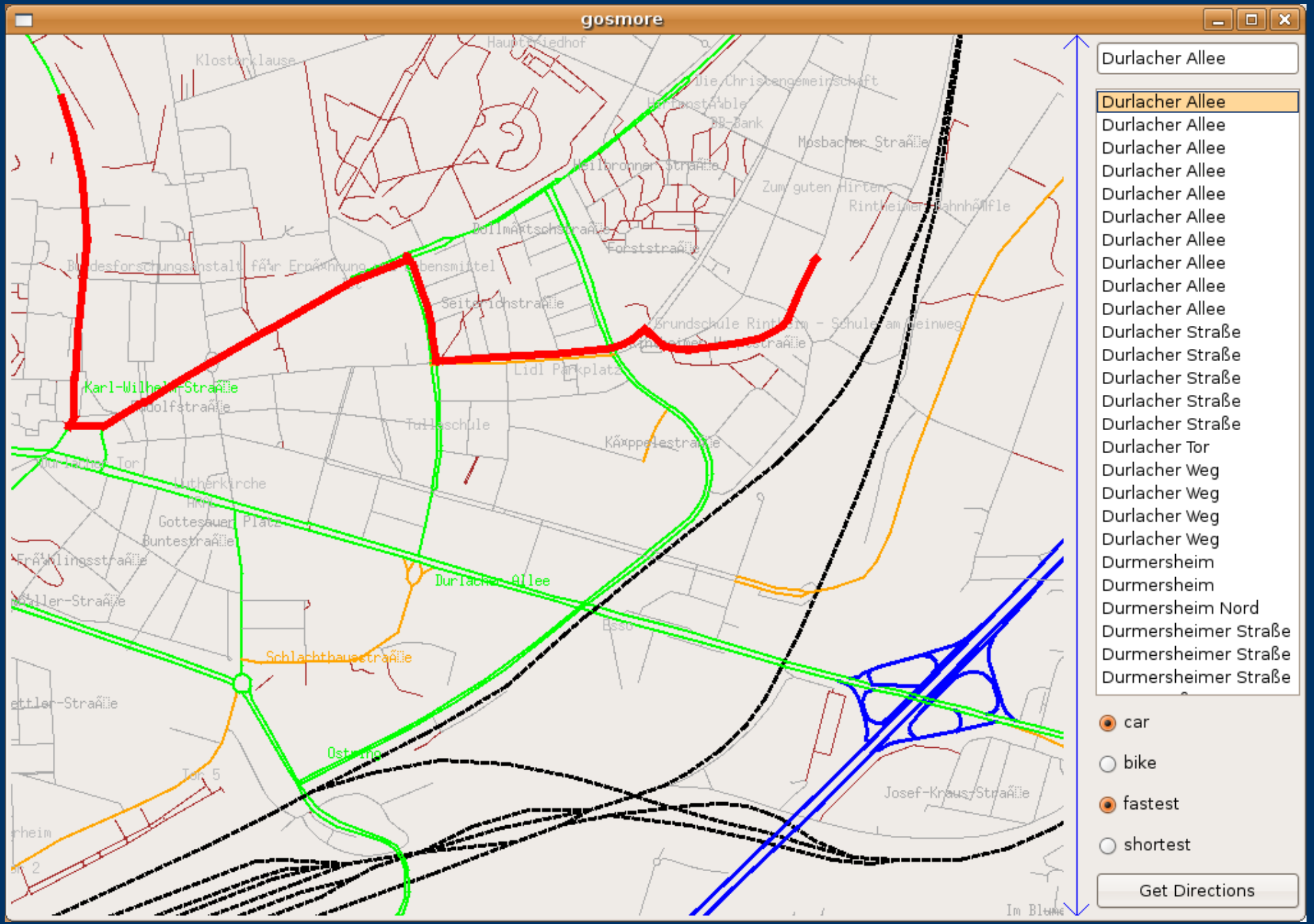
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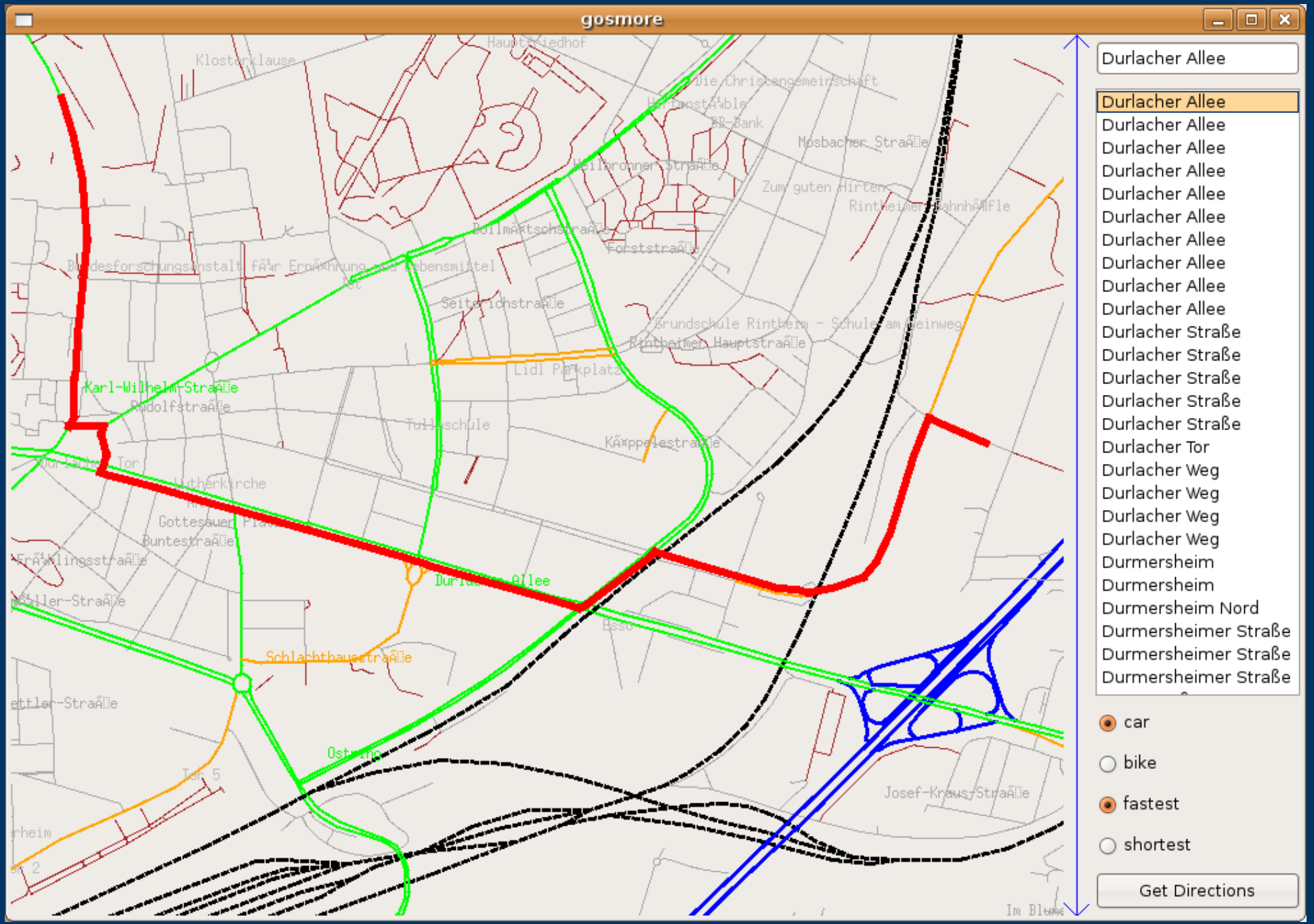
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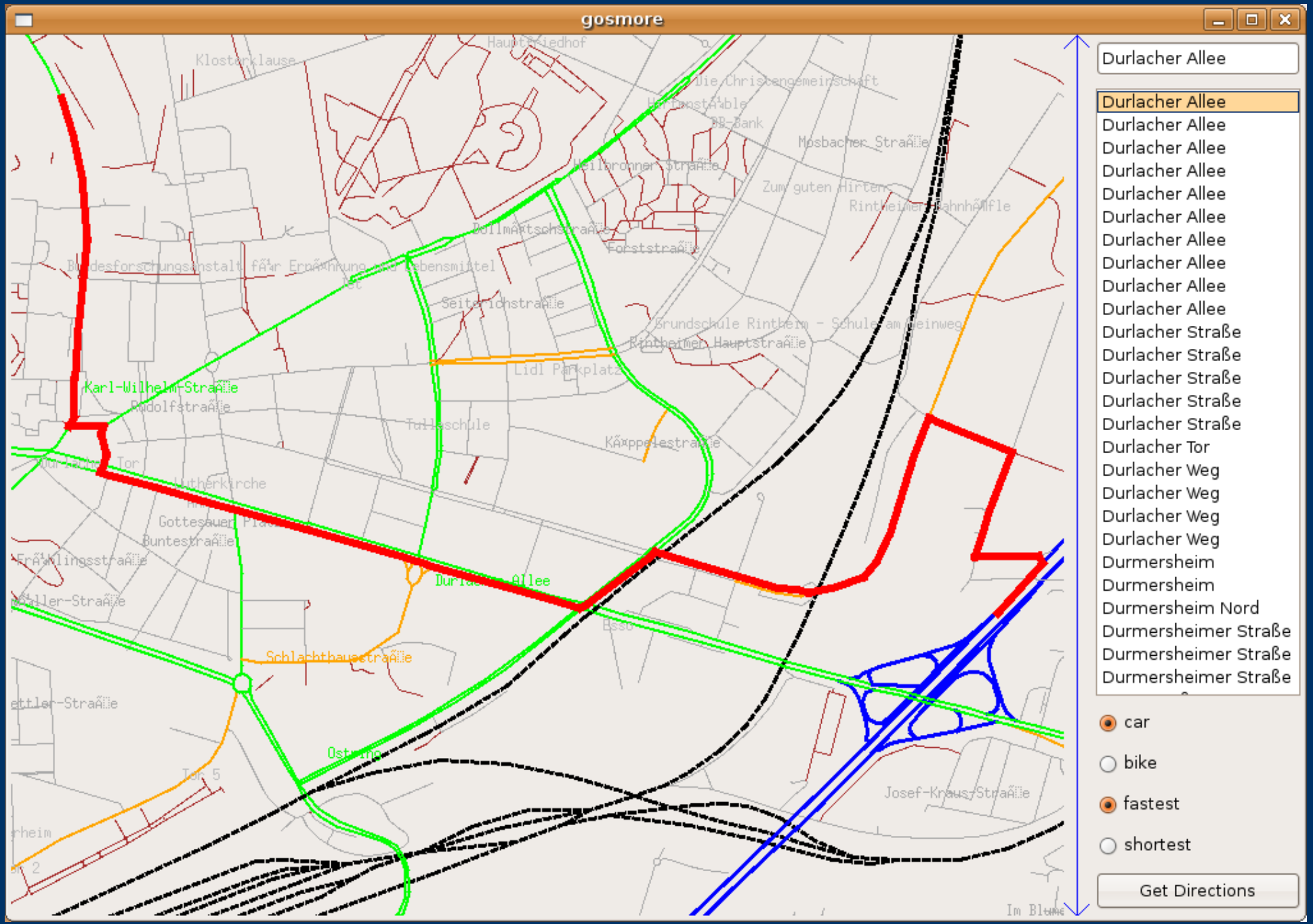
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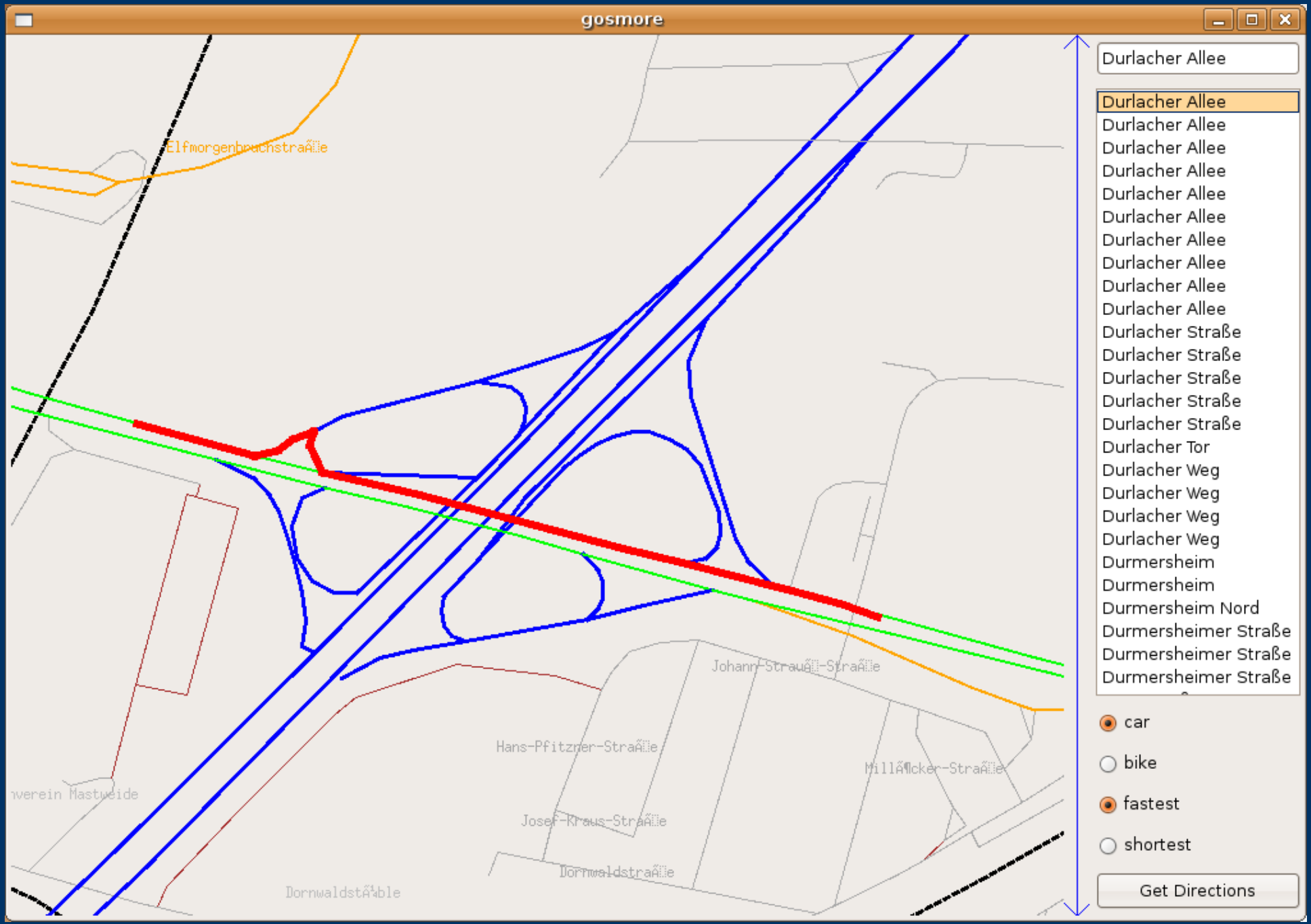
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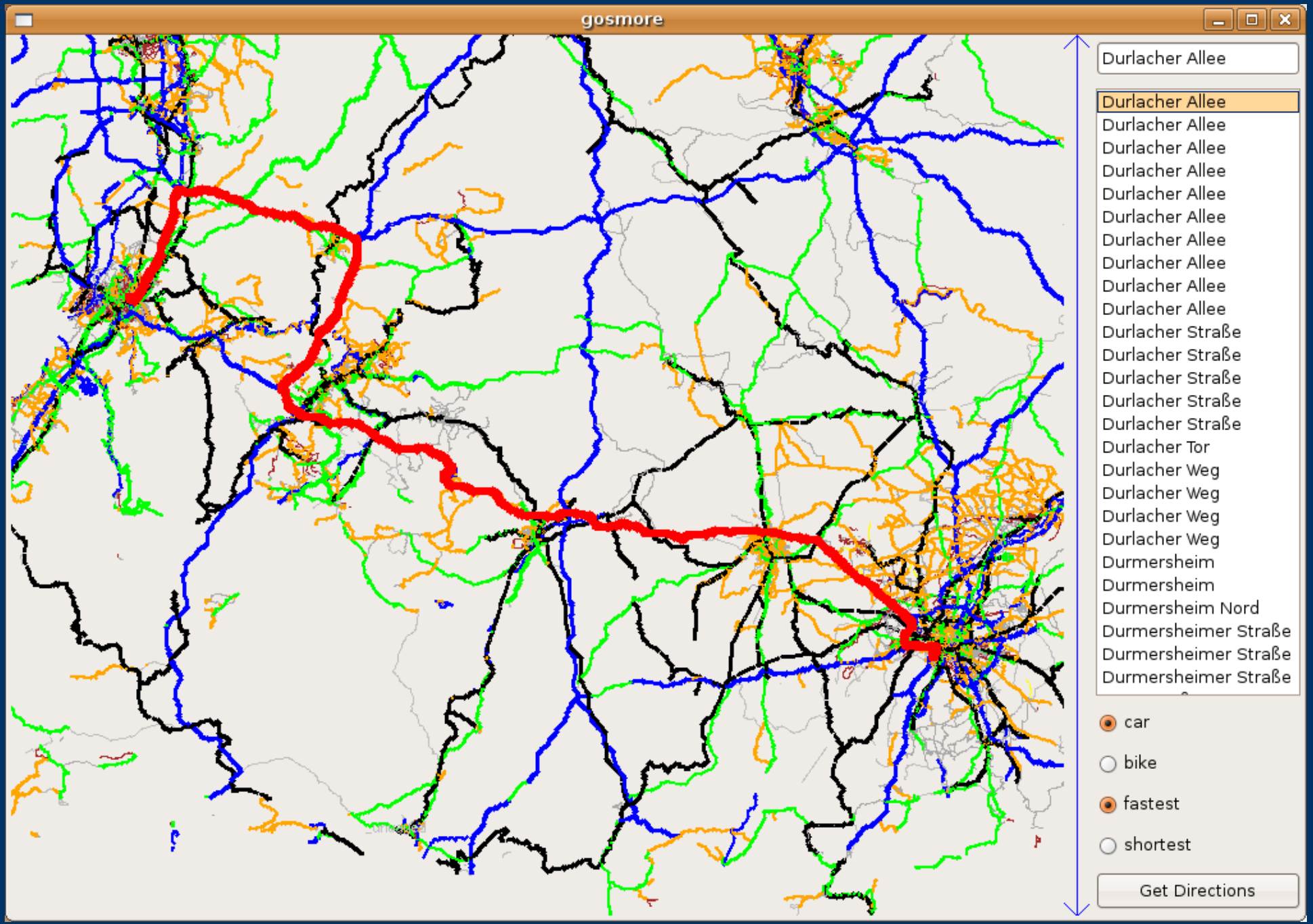
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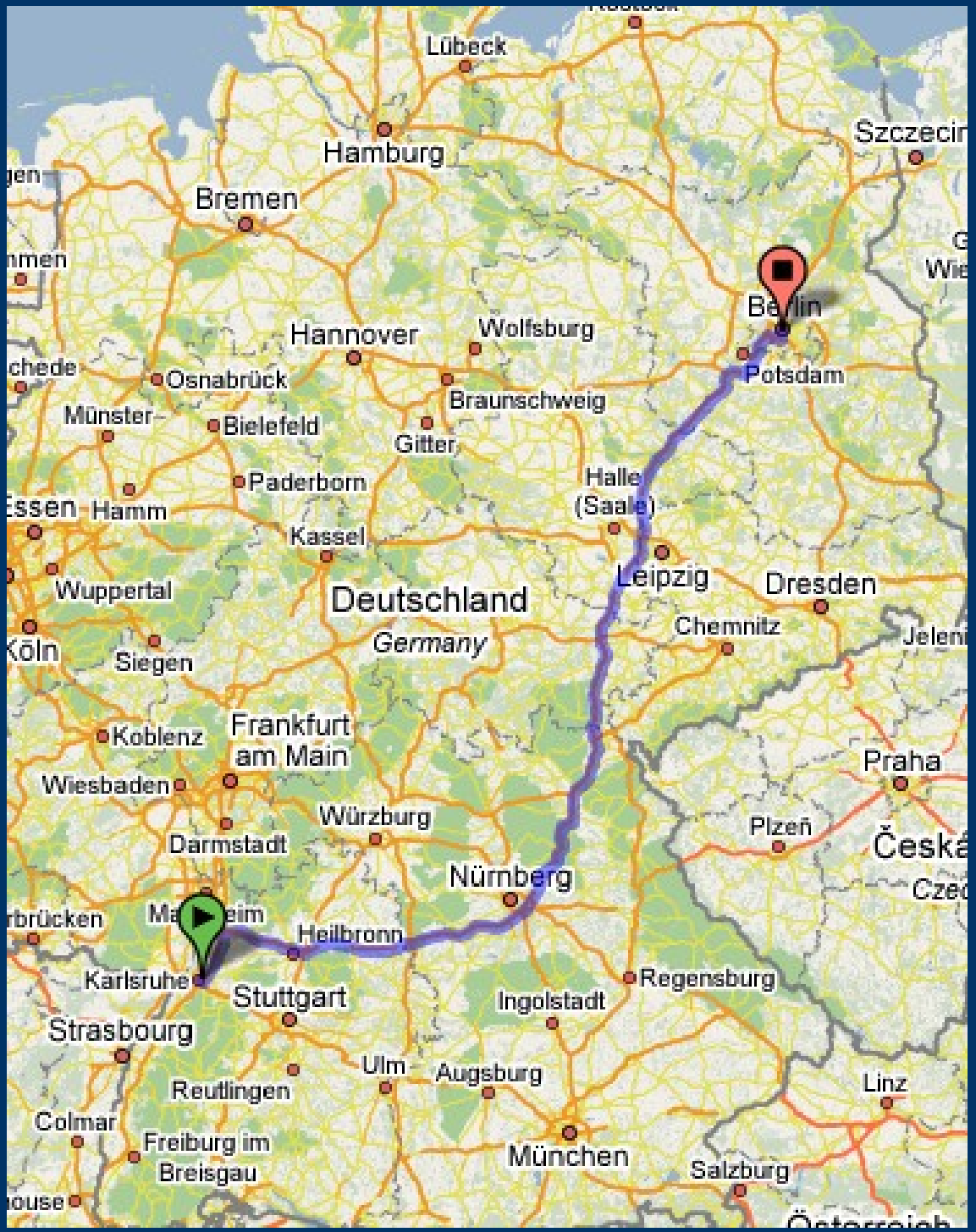
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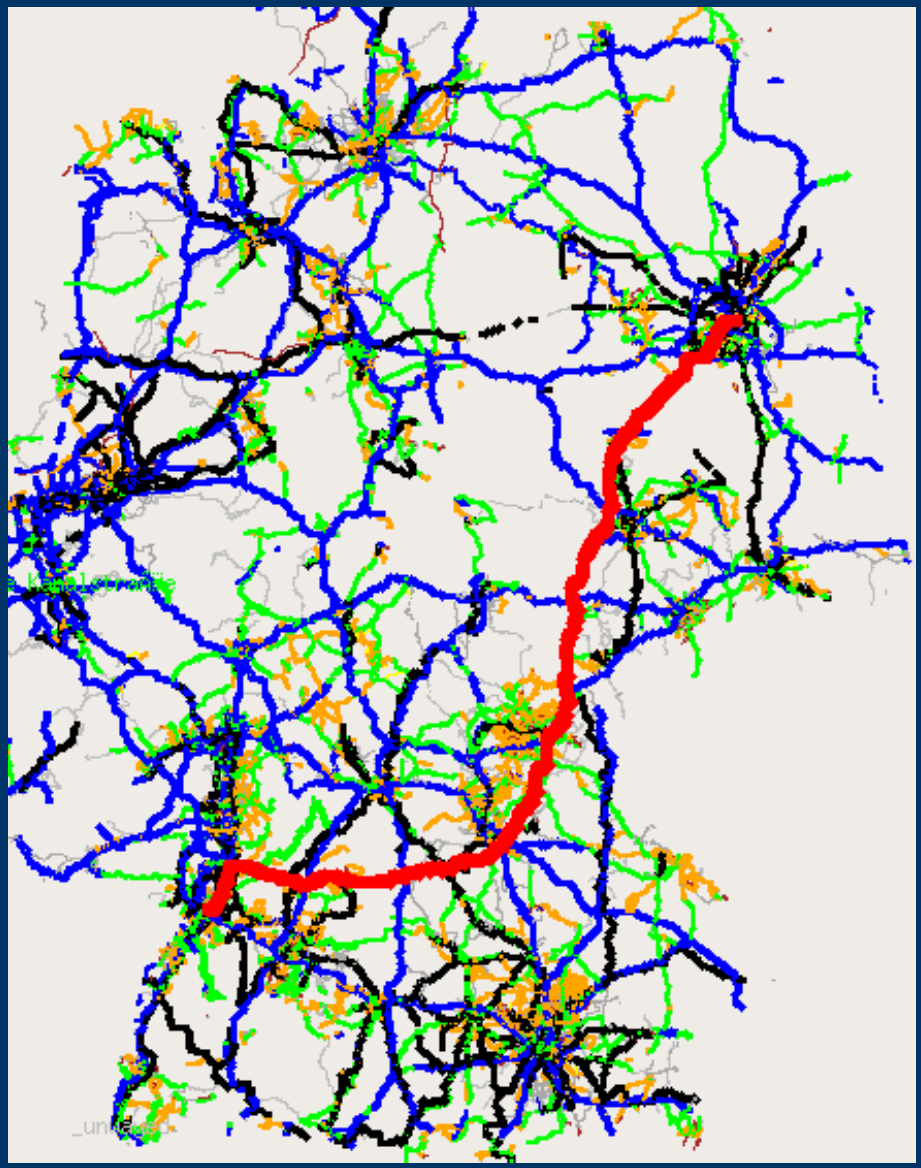
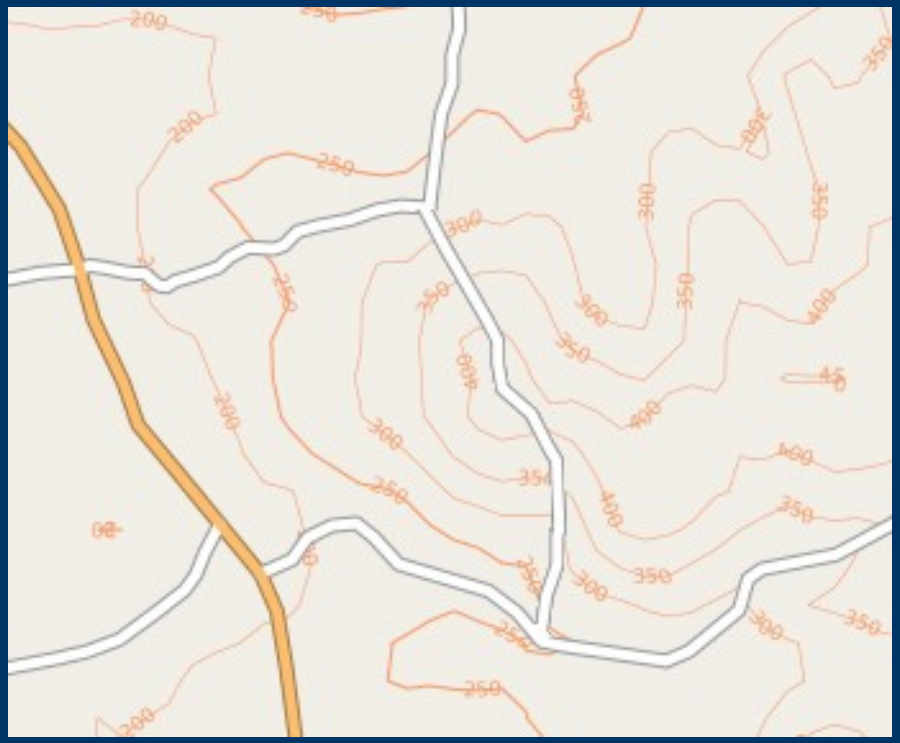


1. Take the exit onto A5 toward Frankfurt	Left turn
35.5 km, 18 mins	A115,E51
2. Take exit 40-Kreuz Walldorf to merge	A115,E51,Avus
onto A6 toward Heilbronn	Left turn
205 km, 1 hour 45 mins	Left turn
3. Take exit 60-Kreuz Nürnberg-Ost	Right turn
toward Berlin/Dresden/Bamberg/N.-	Left turn
1.1 km	Right turn
4. Merge onto A9	A115 -> A100
380 km, 3 hours 17 mins	A100
5. Continue on A10	Left turn
9.9 km, 5 mins	Right turn
6. Take exit 16-Dreieck Nuthetal to merge	Knobelsdorffstraße
onto A115 toward Berlin-	Right turn
Zentrum/Berlin-Zehlendorf/Potsdam-	Sophie-Charlotten-Straße
Zentrum	Left turn
29.4 km, 18 mins	Kaiserdamm
7. Merge onto A100	Bismarckstraße
8.3 km, 4 mins	Bismarckstraße
8. Take exit 20-Tempelhofer Damm for	Right turn
B96, 0.3km	Ernst-Reuter-Platz
9. Turn left at B96/Tempelhofer Damm	Straße des 17. Juni
...	...

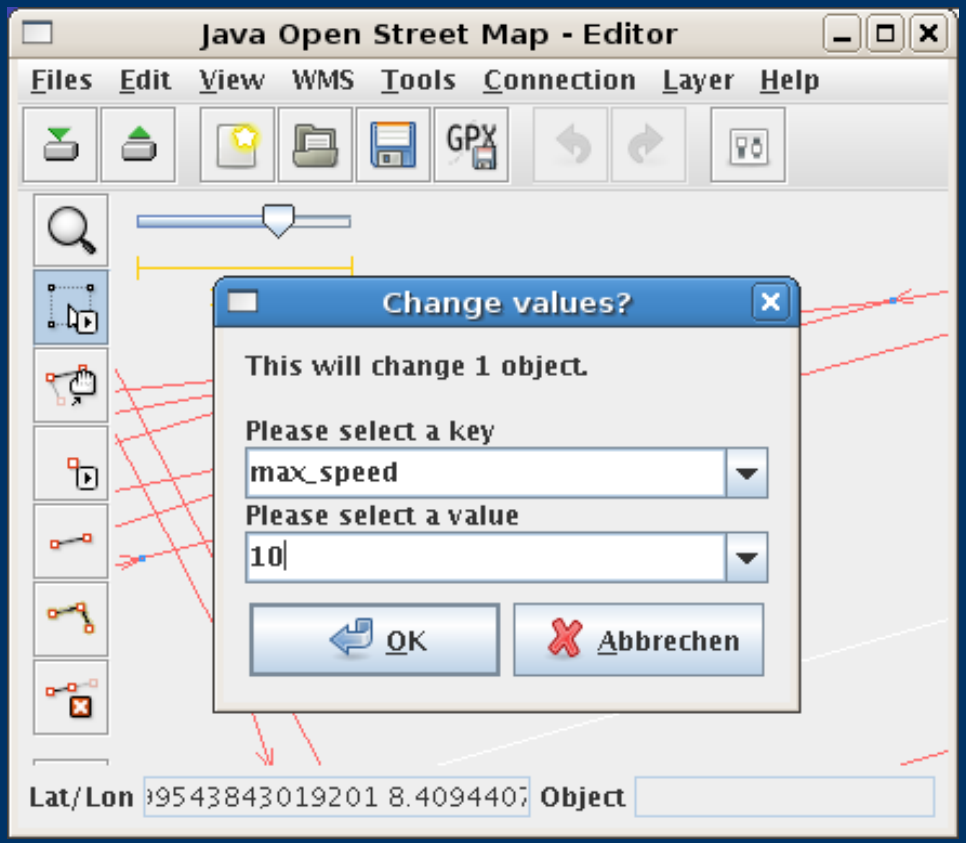
Future – Opportunities

- Specialist Routing
  (Bikes, Pedestrians - Waterways?)
- Current Data
- Routing with
  “User Feedback”



Future – Caveats

- Result-Oriented Vandalism



Future – Caveats

- Errors and Omissions

Conclusion

- routing not #1 priority for contributors at the moment
- large potential to be better than existing commercial offers
- data incomplete, data model insufficient
- but works surprisingly well already!

Thank You

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