The Breadth of OR

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What is OR?

• Science of Better
• … looks at an organisation's operations and uses mathematical or computer models, or other analytical approaches, to find better ways of doing them
• OR uses the scientific method to improve the way in which decisions are made
What does it cover?

- **Applications** - forecasting, inventory, investment, location, logistics, maintenance, marketing, packing, purchasing, production, project management, reliability and scheduling

- **Environments** - community OR, education, energy, finance, government, health services, manufacturing industries, mining, sports, and transportation

- **Technical approaches** - decision support systems, expert systems, heuristics, networks, mathematical programming, multicriteria decision methods, problems structuring methods, queues, and simulation
Conservation: Black Rhino

- Million in 1900
- 2400 last decade
- 3600 today
- 12 African countries lost their entire populations between 1970 and 1990

South African National goal: 2000
Translocation Strategy

• High population density - low fecundity, high mortality
• Disperse populations from high to low density
Translocation Strategy

Source population

High Density

Translocated populations

Low Density
Game Ranching

• Average ranch size ~ 3000 ha
  – Not large enough for major predators
  – Offtake of surplus stock necessary

What population size of each species will maximise returns from offtake?
Investigating Management Strategies for Commercial Beef Production in Namibia

- Semi-desert climatic conditions
- Prolonged periods of drought
- High rainfall variability
Truck Scheduling
## Truck Scheduling

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<th>Depot</th>
<th>Trip time (hours)</th>
<th>Trips req.</th>
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<tr>
<td>20</td>
<td>5.29</td>
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</tr>
</tbody>
</table>
The Problem

- Drivers work 8 hour shifts
- Trucks operate 24 hours
- Only five loaders

Find the minimum number of trucks needed
Remarks

• Methods of OR (eg optimisation) reduce computational effort
• More computational power means bigger problems can be solved
• Packages cannot handle everything