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# Hook, Line, and Data: Bringing more Students to Computing with Data Science

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# Why am I here?

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- What is JMSS
- Computational & Data Science at JMSS
- The problem with Computation in Schools
- How can Universities help?



# JMSS

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- Specialist Science School
- Based on Monash University Clayton Campus
- Years 10-12
- Highly Motivated Students
- Many opportunities to work with scientists at Monash (and elsewhere)



# CS@JMSS

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- Year 10 Data Science (Core)
  - Emphasis on Programming, Numerical Accuracy, and Visualisation
  - Using Data to tell a story
- Year 11 Computing (Elective)
  - Broad introduction to Computer Science
  - Focus on Computational Science



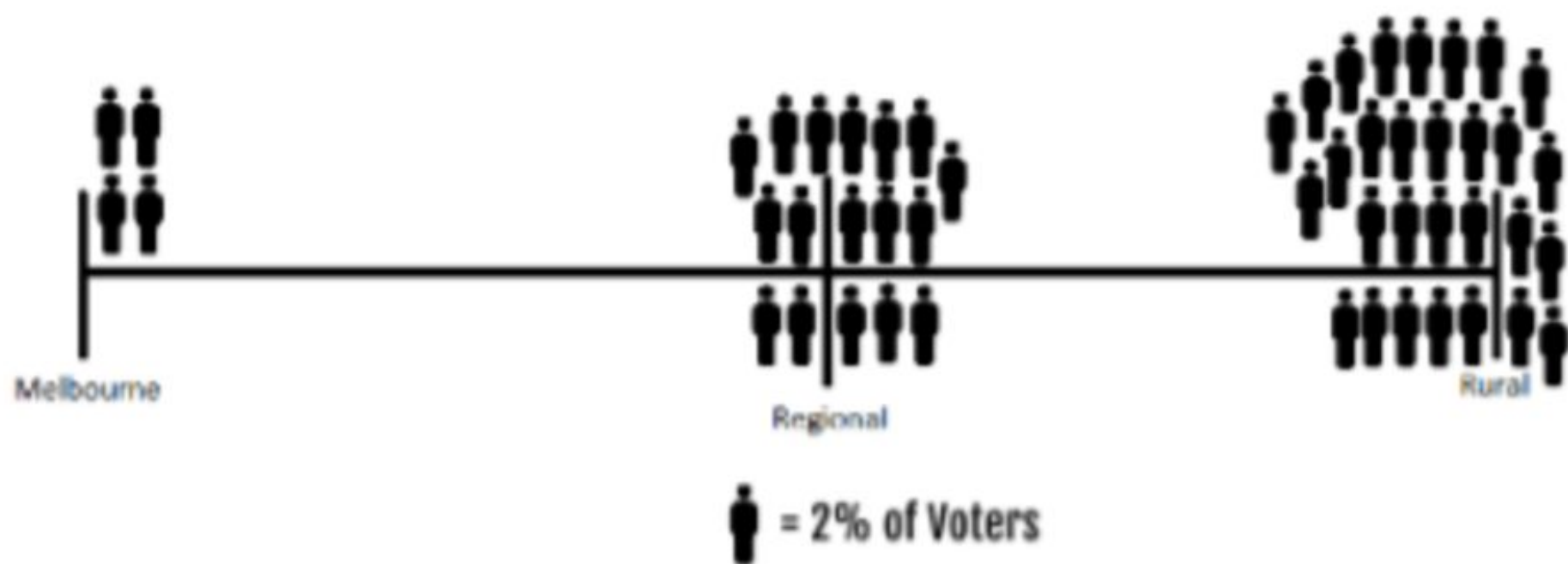
# Data Science

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- Since piloting Data Science at year 10, year 11 CS elective has grown from 28 to 39 students
- (But correlation is not causation :-)
- Project uses real data
  - > Students have the chance to make discoveries
- So far voting data, microbat research data



## Where are Pauline Hanson voters?

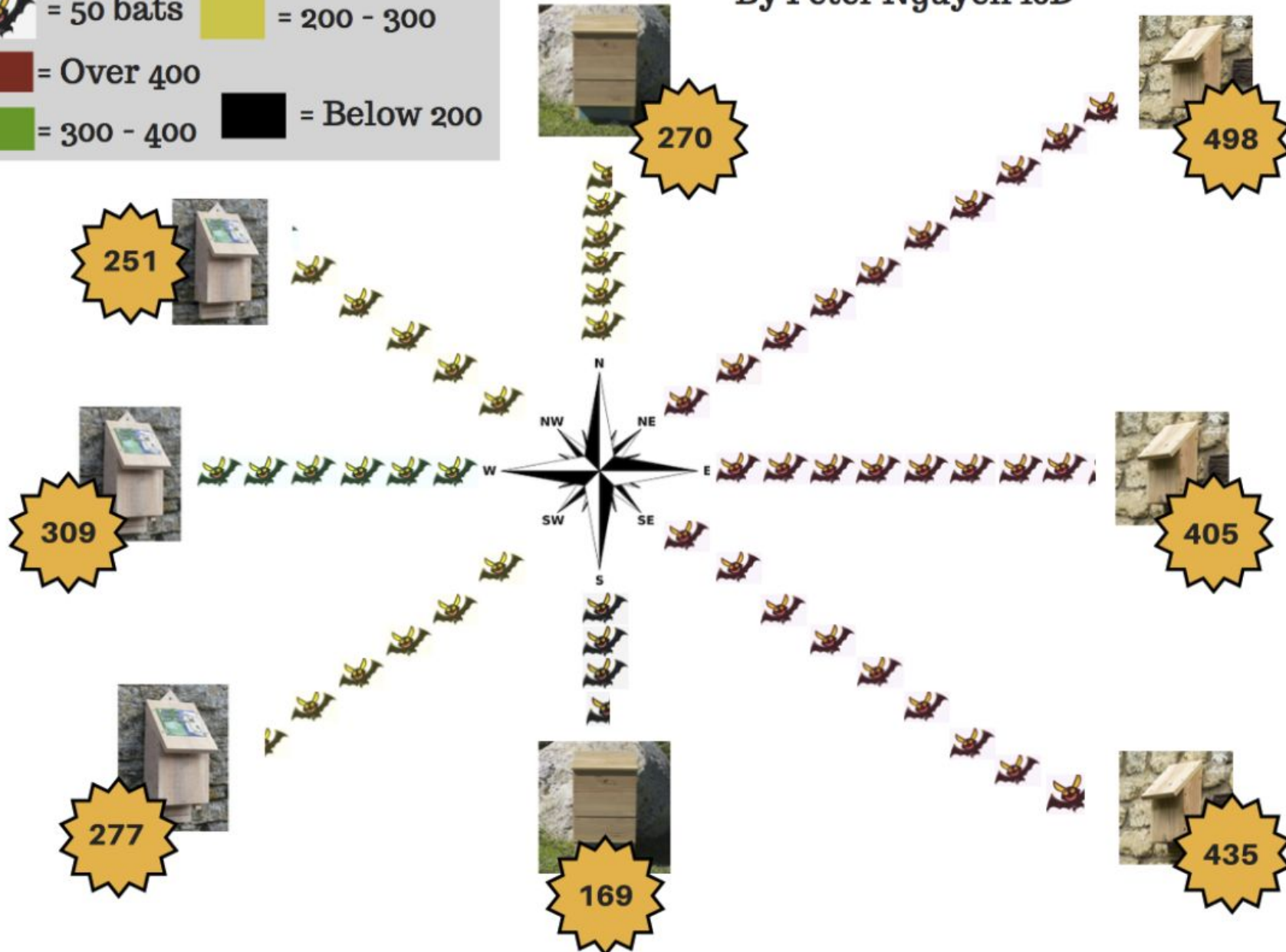


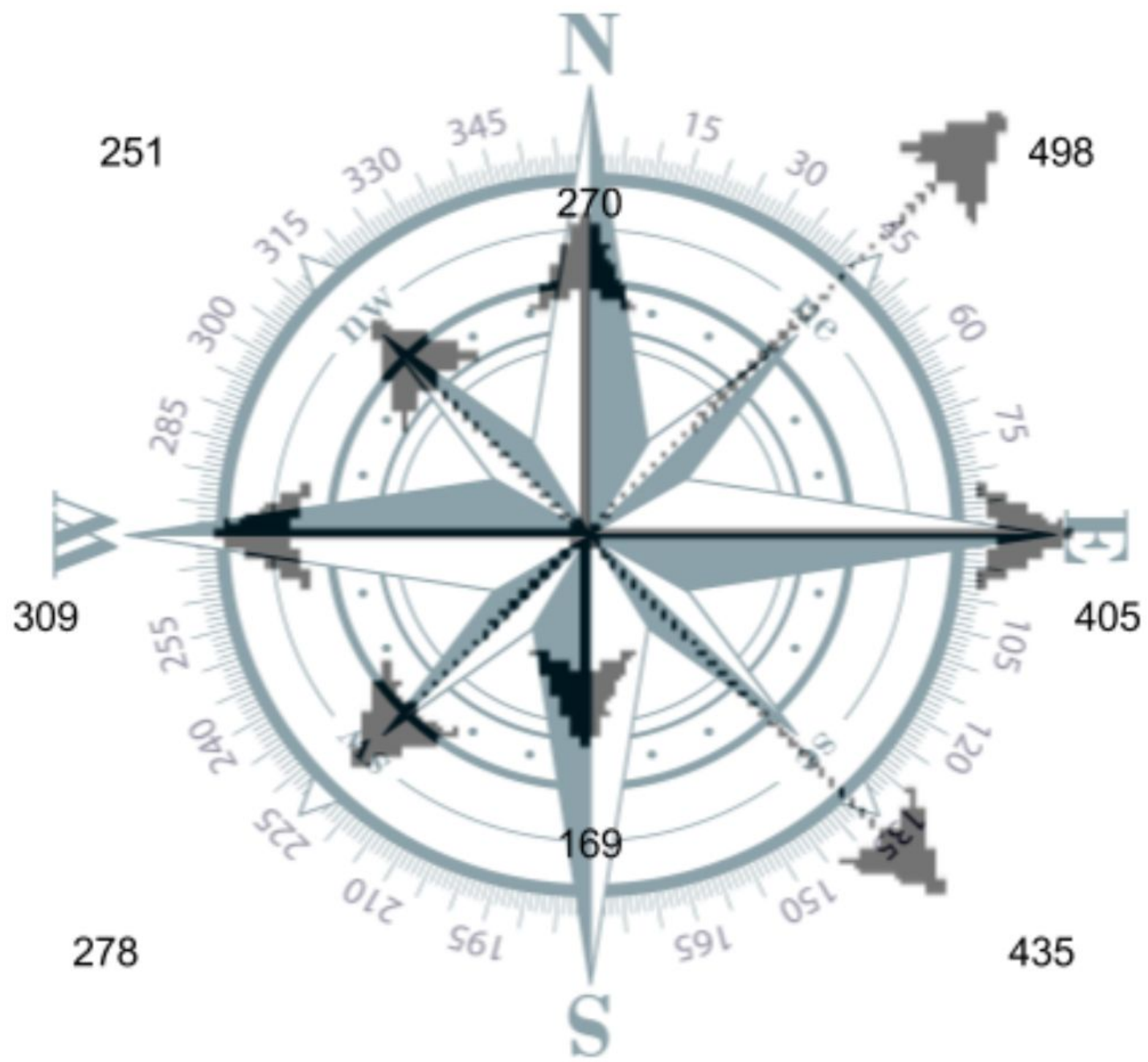
**58% of Pauline Hanson voters lie in rural areas.**



# Wilson Reserve Average Number of Bats

By Peter Nguyen 10D







# Year 11 Computer Science

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AI

Ethics & Privacy

Computational Science

Usability

Programming (Python)

Big Data

## **Computational Science Assignment**

Scientists with domain  
knowledge but without  
computational skills

Students with computational  
skills but without domain  
knowledge

Everybody wins!



# Computational Science Assignment Examples

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**Molecular biology - Cancer research**

**Marine biology - dolphins & seal behaviour**

**Citizen Science - climate change**

**Neuroscience - rat brainwaves**

**Psychology - sleep science**



# Challenges

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- Schools lack teachers with programming expertise (not to mention Data Science)
- Training takes time (teachers have less than none)
- Teaching and supporting programming when you have only just learnt it is *incredibly* difficult



## Some stats

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Over 60% of Computing teachers in Australia are male

Almost 40% are both male and over 50 years old!

Nearly all of the female teachers are also over 50

EEK! We think we have a skills shortage *now!!*

source: ACER insights report



# How can Unis support Data Science in schools?

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- Get universities into classrooms
- Teach kids directly
  - especially primary schools
- Teach Teachers
  - not just IT/ICT teachers
  - Maths & Science teachers can integrate code directly into their existing curriculum
  - But they need help to get started, & ongoing support
- Partner with your Education Faculties to build Computing into their curriculum



# How can Unis support Data Science in schools?

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- Encourage Undergrads to teach kids and teachers
  - Community Service/Engagement programs
  - Can you give credit for teaching in schools - IBL style?
- Develop and share resources
  - But you **MUST** support them somehow, ongoing
  - Starting out teaching code is scary
  - They will hit problems and need help
  - Perhaps create a community of practice (CSER MOOC from Uni Adelaide is a great example)





# Why Compute?

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"I thought I had to choose between computing and biology"

"Until taking this course code had never even remotely interested me. After taking this course I have learned how relevant the collection and analysis of data is"

"I found this course was very interesting as we were able to analyse the data from real data sets. This is in stark contrast to what a friend of mine is doing at his school, which is textbook coding."

