Great Barrier Reef Data Management System

A beginner's guide to writing good code and asking for help

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IMOS

Integrated **Marine** **Observing** System

IMOS acknowledges the Traditional Custodians and Elders of the land and sea on which we work and observe and recognise their unique connection to land and sea. We pay our respects to Aboriginal and Torres Strait Islander peoples past and present.
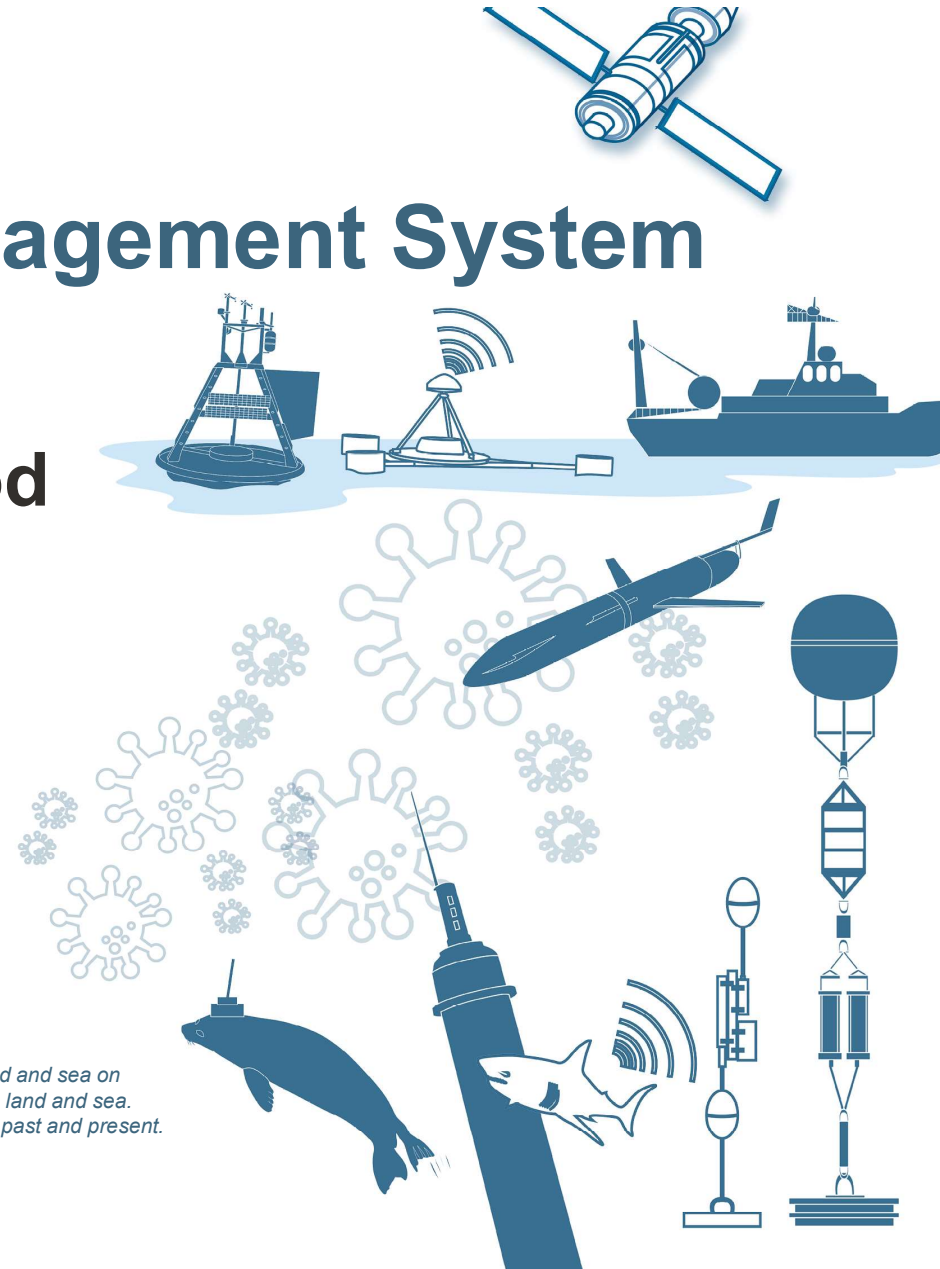
Managing projects

1. **Use R projects**
   Makes all paths relative to main project folder
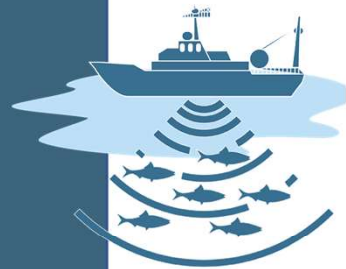   Makes the code is easy to share
   Option to connect to project to GitHub

2. **Create a clear folder structure**
   Files should be easy to find
   Include: README, Data/, Scripts/, Outputs/

3. **Use version control**

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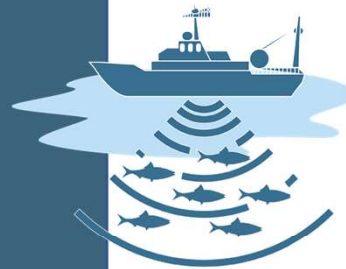
Writing good code

- Break down problem in small pieces
- Write down the steps you need to take to solve the problem
- Be consistent in formatting the code
- Test your code often with small subsets of data
- Get some feedback from colleagues

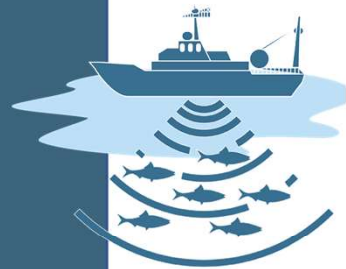IMOS Integrated **Marine Observing** System
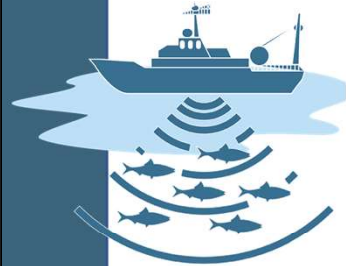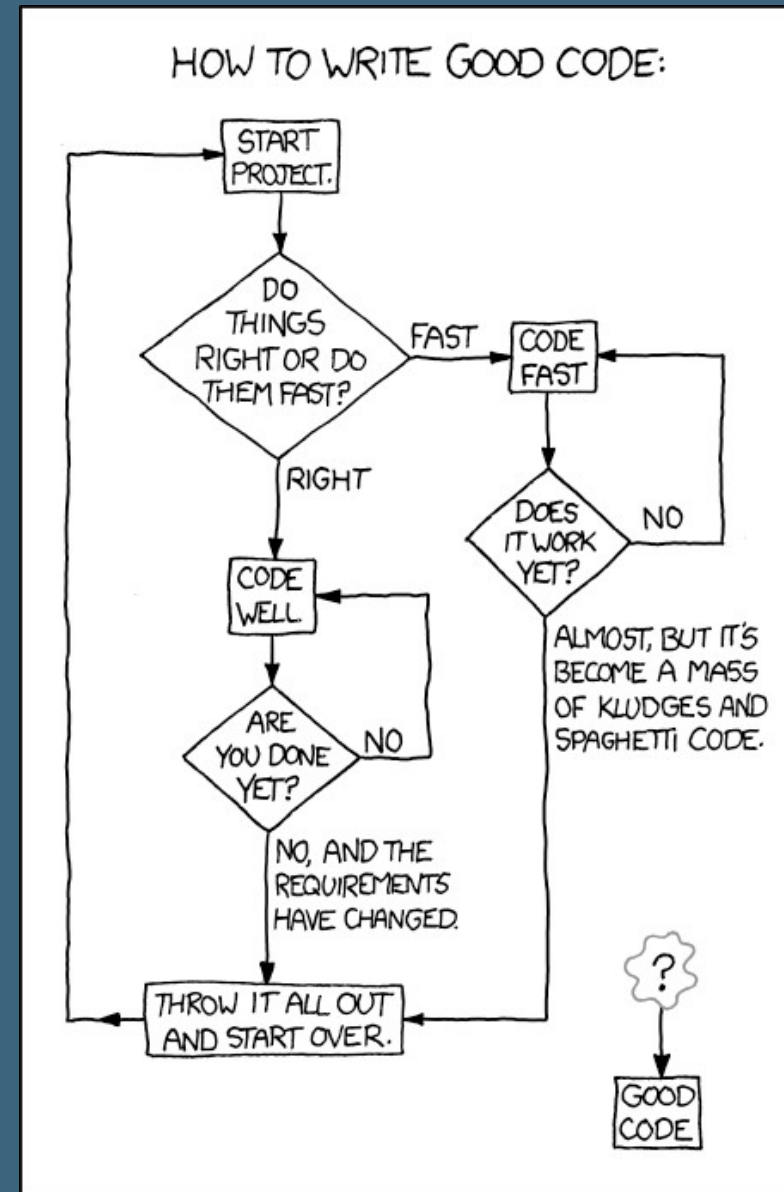
Writing good code

What is wrong with this picture?


```r
library(terra)
x <-rast("C:/Users/Username/Documents/My Project/someraster-here.nc")
#mean(x)
libray(readr)
y<-read.csv("someFile.csv") #This file has metadata
# y|> select(name, coords,date, value) |> mutate(date2=month(date))|>group_by(
#    summarise(mean=mean(value, na.rm))
#The line above did not work
library(lubridate)
y_new =y|> select(name, coords,date, value) |> mutate(date2=month(ymd(date)))
    summarise(mean=mean(value, na.rm))
```

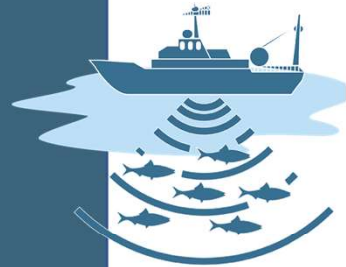IMOS Integrated **Marine Observing** System

Writing good code

```r
# Libraries
library(terra)
library(readr)
library(lubridate)

# Load raster containing sea surface temperature (SST)
sst_ras <- rast("data/sst_raster_noaa.nc")

# Load data containing the information of animal sightings
sightings <- read_csv("data/sightings.csv") |>
  #Keep only relevant columns
  select(site_name, coords, date, value) |>
  #Get month from date
  mutate(month = month(date))

# Create monthly summaries
monthly_summaries <- sightings |>
  group_by(site_name, month) |>
  summarise(mean_sighthings = mean(value, na.rm = TRUE))
```

API_data_access.Rmd   useful_functions.R   Untitled1*

Source on Save   Run   Source

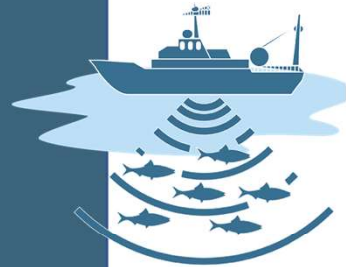IMOS Integrated **Marine Observing** System

Writing good code


```
8    // Dear programmer:
9    // When I wrote this code, only god and
10   // I knew how it worked.
11   // Now, only god knows it!
12   //
13   // Therefore, if you are trying to optimize
14   // this routine and it fails (most surely),
15   // please increase this counter as a
16   // warning for the next person:
17   //
18   // total_hours_wasted_here = 254
19   //
20
```

Writing good code

- Code is for computers, but comments are for humans. Your future self will thank you for it.

- Use names that are descriptive.

- Do not be afraid to use white space, but do not make too wide. Minimise the need for scrolling horizontally.

- If you repeating the same chunk twice, create a function.

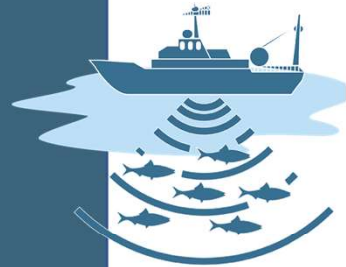- If unsure, check out code style guides.

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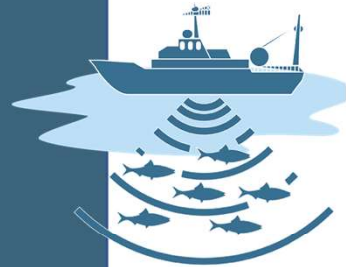- If unsure, check out code style guides.
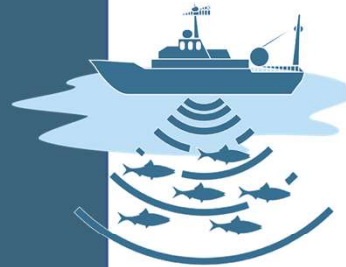
What if you get an error?

- Errors may look scary, but they are quite informative.

- Do not assume you know what causes the issue, read the error carefully.

- Find key words describing the source of the error.

- Google the error, but do not include highly specific information, such as file paths.

- If you have trouble solving the problem, trace it back, find the line causing the error.

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Asking for help

- If you cannot find a solution, ask for help.

- Avoid common issues when asking for help:

  - Do NOT share a screenshot of the error

  - Provide context: describe the issue clearly, describe how you tried to fix it

  - Include a (small) sample of the code and any files so error can be reproduced

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Asking for help

strategy: write a **message** asking for help

When I'm REALLY stuck, I'll write a message / forum post:

→ "Here's what I'm trying to do..."

→ "I did X and I expected Y to happen, but instead..."

→ "Could this be because....?"

→ "This seems impossible because..."

→ "I've tried A, B, and C to fix it, but...."

This helps me organize my thoughts, and often by the time I finish writing, I've magically fixed the problem on my own!
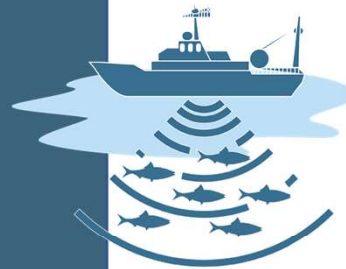
by Julia Evans   @b0rk   wizardzines.com

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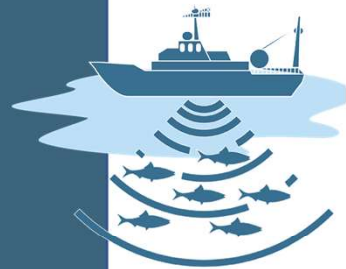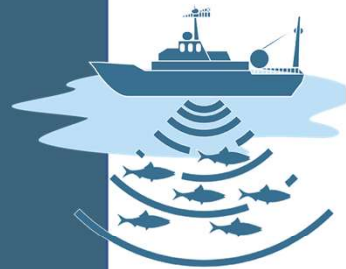
Want to know more?

Some great resources are listed below:

- The tidyverse style guide

- Reproducible Research by The Turing Way

- Reproducible Code by the British Ecological Society

- Improving code reproducibility from Nature

- Australian Research Data Commons

- Beautiful Code, Because We're Worth It!

- Best practices for writing reproducible code

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Want to know more?

Still unsure how to ask for help? Check these links:

- [Help me help you: a guide to asking for help](#)

- [Reading error messages is really important](#)

- [How debug your code for beginners](#)

- [How to create a minimal reproducible example](#)

- [How do I ask a good question?](#)

IMOS Integrated **Marine Observing** System

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

Australia's Integrated Marine Observing System (IMOS) is enabled by the National Collaborative Research Infrastructure Strategy (NCRIS). It is operated by a consortium of institutions as an unincorporated joint venture, with the University of Tasmania as Lead Agent. **www.imos.org.au**

IMOS thanks the many other organisations who partner with us, providing co-investment, funding and operational support, including investment from the Tasmanian, Western Australian and Queensland State Governments.

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