Lesson 6: Ornithology Theme

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Contents

1. ▢ Welcome back to R!

In lesson one, through four you learned about objects, vectors, functions and how to handle missing data in R. In this lesson, you will learn about subsetting, extraction, and insertion in data frames. You rarely analyse an entire data table at once. You nearly always pull out specific rows or columns, or write back cleaned-up values. Mastering R's bracket "[ ]" syntax is therefore foundational.

To begin Lesson 6, follow these steps:

1. Open your course project for RStudio

2. Create a new file. Today, let's use ▢ "R Markdown" again (File > New File > R Markdown).

3. Type in the code provided in this document as you follow along with the video. Pause the video at anytime to answer assignment questions, dig deeper or add memo notes.

Lesson Overview

By the end of Lesson 6 you will be able to:

1. ▢ Remember – State R's basic subsetting template: x[rows, cols].

2. ▢ Understand – Describe the difference between $ and [ ] for data frames.

3. ▢ Apply – Use logical tests + which() to select rows.

4. ▢ Analyze – Summarize a subset to answer a question.

5. ▢ Evaluate – Choose an insertion (overwrite) vs. safe copy strategy

Keep these goals in mind as you move through each section.

2. Quick Warm-up

Type the following code in a new code chunk and run.

```r
# Review the `sample()` function from lesson 3.
set.seed(1)

args(sample)  #☐ Check the arguments of sample()
```

```
## function (x, size, replace = FALSE, prob = NULL)
## NULL
```

Type the following code in a new code chunk and run.

```r
set.seed(1)
trial_vec <- sample(x = c(1:3, NA, NA, NA, NA), size = 25, replace = TRUE)
trial_vec
```

```
## [1]  1 NA NA  1  2 NA NA  3 NA  2  3  3  1 NA NA  2 NA NA  2 NA  1 NA NA NA  1
```

Type the following code in a new code chunk and run.

```r
set.seed(1)
trial_vec <- sample(size = 25, replace = TRUE, x = c(1:3, NA, NA, NA, NA))
trial_vec
```

```
## [1]  1 NA NA  1  2 NA NA  3 NA  2  3  3  1 NA NA  2 NA NA  2 NA  1 NA NA NA  1
```

☐ NOTICE: Does changing the order of arguments affect the output? Why?

☐ Break Things! Can you change the order of the arguments without assigning the argument name (e.g,TRUE, 25, c(1:3, NA, NA, NA, NA)) instead of replace = TRUE, size = 25, x = c(1:3, NA, NA, NA, NA))? Create a memo note, demonstrate learning skill(s) used.

Learning Skill: Review is.na() and which() from lesson 4 and Nesting from lesson 3

```
# Part 1
is.na(trial_vec)
```

```
## [1] FALSE  TRUE  TRUE FALSE FALSE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE
## [13] FALSE  TRUE  TRUE FALSE  TRUE  TRUE FALSE  TRUE FALSE  TRUE  TRUE  TRUE
## [25] FALSE
```

☐ Explain: What type of object is returned? What is its length relative to trial_vec?

```
# Part 2
which(is.na(trial_vec))
```

```
## [1]  2  3  6  7  9 14 15 17 18 20 22 23 24
```

☐ Explain: What are these numbers: values from the vector or positions in the vector? How do these numbers relate to the TRUE entries from part (1)?

```
# Part 3
which(!is.na(trial_vec))
```

```
## [1]  1  4  5  8 10 11 12 13 16 19 21 25
```

☐ Explain: Interpret these numbers the same way as in part (2). Create a memo note, demonstrate learning skill(s) used. ___

☐ Are you ready? Remember to summon help whenever you need it.

3. Build a Data Frame

In lesson 2 you learned how to create a data frame using the function data.frame() to combine three vectors of equal length. You created these vectors using the c() function. In this lesson, you will create the vectors using the ifelse() function. Type the following code in a new code chunk.

```
?ifelse # Open the Help for the ifelse() function
```

```
args("ifelse")  # □  Check the arguments of ifelse()
```

```
## function (test, yes, no)
## NULL
```

ifelse() is a vectorized function that allows you to create a new variable based on a condition. Type the following code in a new code chunk.

```
# Example: Create a new vector trial_vec2 based on trial_vec
trial_vec2 <- ifelse(trial_vec == 2, "two", "not two")
```

This creates a new vector where each element is "two" if the corresponding element in trial_vec is 2, and "not two" otherwise. It takes three arguments:

- condition: a logical test (e.g., trial_vec == 2)

- value_if_true: the value to assign if the condition is TRUE

- value_if_false: the value to assign if the condition is FALSE

Now, let's create a data frame using trial_vec and trial_vec2. Type the following code in a new code chunk and run.

```
# Create a data frame with trial_vec and trial_vec2
trial_df <- data.frame(trial_vec, trial_vec2)
```

□ Check the data frame trial_df.

```
# head(trial_df)
head(trial_df) # Prints only for first 6 rows of trial_df
```

trial_vec	trial_vec2
1	not two
NA	NA
NA	NA
1	not two
2	two
NA	NA

☐ Comment: Describe trial_df.

☐ That was a practice round. Now, let's create a more complex data frame with two long vectors of equal length.

Field Biology: Bird Banding Observations ☐

This theme simulates data from a field biologist observing a population of birds, where most are untagged, but a small number have been previously captured and marked with colored leg bands. This is a very common practice in ecology and behavioral studies.

We'll simulate a small inventory called field_sightings with two columns:

- Status – Describes whether the sighted bird is "Untagged" (the common case) or "Tagged" (the rare case).

- Band_Color – If a bird is untagged, the value is "None." If it is tagged, the value is one of several possible band colors.

Cope and paste the following code in a new code chunk.

```r
set.seed(8)
Status  <- sample(c(rep("Untagged", 3091), rep("Tagged", 287)))
Band_Color <- ifelse(Status == "Untagged", "None",
          sample(c("Red", "Blue", "Green", "Yellow",
               "Silver", "Black", "Orange",
               "White"), length(Status), replace = TRUE))
field_sightings <- data.frame(Status, Band_Color)

# View the data
View(field_sightings)
```

☐ Look deeper: Why does the code has line breaks with indentation? What is the advantage of indented line breaks? When might this be useful for you? Create a memo note, demonstrate learning skill(s) used.

Cope and paste the following code in a new code chunk.

```r
cohort_means <- c(Red=14, Blue=20, Green=26, Yellow=32, Silver=38, Black=44, Orange=50, White=56)
cohort_means
```

```
##    Red   Blue  Green Yellow Silver  Black Orange  White
##     14    20    26    32     38     44     50     56
```

```r
field_sightings$Age_Months <- round(ifelse(field_sightings$Status=="Untagged",
  pmin(pmax(rnorm(nrow(field_sightings), 6, 3), 0), 11),
  pmax(12, rnorm(nrow(field_sightings),
          mean = replace(cohort_means[field_sightings$Band_Color],
                  is.na(cohort_means[field_sightings$Band_Color]), 20),
          sd = 3))))

View(field_sightings)
```

4. Bracket Syntax

☐ Review Lesson 2 about indexing vectors x[ ]. Create a memo note, demonstrate learning skill(s) used. Create a memo note, demonstrate learning skill(s) used.

In this lesson we will use the same syntax to subset data frames.

- x is the object (vector, data frame, etc.)

- [ ] is the bracket operator for subsetting

- x[rows, cols] extracts specific rows and columns from x.

- rows and cols can be: indices (1, 3:5), names ("Band_Color"), or a logical vector / expression (Status == "Tagged").

Type the following code in a new code chunk and run.

```
field_sightings[1:3, ]  #  Shows full row extraction
```

Status	Band_Color	Age_Months
Untagged	None	6
Untagged	None	8
Tagged	White	50

```
# R's subsetting format:  x[rows, columns]
field_sightings[1:3, 1]  #  Shows first three rows of first column
```

```
## [1] "Untagged" "Untagged" "Tagged"
```

```
field_sightings[1:3, c(1, 2)]  #  Shows first three rows of first and second
```

Status	Band_Color
Untagged	None
Untagged	None
Tagged	White

5. Subsetting

We'll start with trial_df from earlier. Type the following code in a new code chunk and run.

```
trial_df[trial_df$trial_vec == 2, ]
```

	trial_vec	trial_vec2
NA	NA	NA
NA.1	NA	NA
5	2	two
NA.2	NA	NA
NA.3	NA	NA
NA.4	NA	NA
10	2	two
NA.5	NA	NA
NA.6	NA	NA
16	2	two
NA.7	NA	NA
NA.8	NA	NA
19	2	two
NA.9	NA	NA
NA.10	NA	NA
NA.11	NA	NA
NA.12	NA	NA

```
# Test direct subsetting (will include NA rows)
direct_subset <- trial_df[trial_df$trial_vec == 2, ]
print(direct_subset)
```

```
##      trial_vec trial_vec2
## NA        NA      <NA>
## NA.1      NA      <NA>
## 5          2      two
## NA.2      NA      <NA>
## NA.3      NA      <NA>
## NA.4      NA      <NA>
## 10         2      two
## NA.5      NA      <NA>
## NA.6      NA      <NA>
## 16         2      two
```

```
## NA.7      NA    <NA>
## NA.8      NA    <NA>
## 19        2     two
## NA.9      NA    <NA>
## NA.10     NA    <NA>
## NA.11     NA    <NA>
## NA.12     NA    <NA>
```

trial_df[trial_df**$**trial_vec **==** 2,]

	trial_vec	trial_vec2
NA	NA	NA
NA.1	NA	NA
5	2	two
NA.2	NA	NA
NA.3	NA	NA
NA.4	NA	NA
10	2	two
NA.5	NA	NA
NA.6	NA	NA
16	2	two
NA.7	NA	NA
NA.8	NA	NA
19	2	two
NA.9	NA	NA
NA.10	NA	NA
NA.11	NA	NA
NA.12	NA	NA

☐ Identify: which rows are extracted?

- TRUE (2 == 2)

- FALSE (1 == 2)

- FALSE (3 == 2)

- NA (NA == 2)

☐ **Goal: isolate only the tagged birds.**

☐ **Step 1** – create a logical test: [ ] vs. $. Type the following code in a new code chunk and run.

field_sightings[field_sightings**$**Status **==** "Tagged",]

field_sightings[field_sightings$Status == "Tagged",] returns the rows where the condition is TRUE, along with all columns.

```
field_sightings$Status == "Tagged"        # TRUE/FALSE for each row
```

field_sightings$Status == "Tagged" returns a logical vector.

☐ **Step 2** – Store subset of field_sightings data frame as a new data frame. Type the following code in a new code chunk and run.

```
tagged_only <- field_sightings[field_sightings$Status == "Tagged", ]
```

☐ Look deeper: How many *rows* did we keep? How could you check the number of rows in a data set? Create a memo note, demonstrate learning skill(s) used, including method you used to answer the question.

Type the following code in a new code chunk and run.

```
n_manual <- nrow(tagged_only)  # ☐ Check number of rows
nrow(tagged_only)
```

```
## [1] 287
```

And 287 makes sense because of this code that created the dataset: Status <- sample(c(rep("Untagged", 3091), rep("Tagged", 287)))

6. Extraction

Using which() is a strategy to handle potential NA values in your data. When the test could include NA, wrap it in which() to drop unknowns.

Type the following R script in your document script and run.

```r
rows_without_na <- which(trial_df$trial_vec == 2)

which_subset <- trial_df[rows_without_na, ]

print(which_subset)
```

```
##    trial_vec trial_vec2
## 5      2       two
## 10     2       two
## 16     2       two
## 19     2       two
```

☐ Explore and Play: What is the difference between running print(which_subset) and which_subset? Create a memo note, demonstrate learning skill(s) used.

When you use a direct logical condition like trial_df$trial_vec == 2, any NA values in the Status column will result in NA in the logical vector. You get only the indices where the condition is TRUE, effectively dropping/ignoring any rows where the comparison resulted in NA. You get a result that excludes rows with NA in the Status column

6.1 $ vs. [ ]

Type the following code in a new code chunk and run.

```r
row_idx <- which(field_sightings[,"Status"] == "Tagged" & field_sightings[,"Band_Color"] == "Blue")
```

The bracket notation [,"column_name"] uses matrix-style indexing.

You can access the same columns using $ notation where field_sightings$Status replaces field_sightings[,"Status"] and field_sightings$Band_Color replaces field_sightings[,"Band_Color"]. Type the following code in a new code chunk and run.

```
row_idx2 <- which(field_sightings$Status == "Tagged" & field_sightings$Band_Color == "Blue")
```

☐ Common Pain Point: Using which() but forgetting to subset columns. Type the following code in a new code chunk and run.

```
subset_blue <- field_sightings[row_idx, ]
head(subset_blue)  #☐ Practice Task 5 logic with known data
```

	Status	Band_Color	Age_Months
182	Tagged	Blue	19
208	Tagged	Blue	30
293	Tagged	Blue	21
319	Tagged	Blue	25
502	Tagged	Blue	17
635	Tagged	Blue	19

```
head(x = subset_blue, n= 3)
```

	Status	Band_Color	Age_Months
182	Tagged	Blue	19
208	Tagged	Blue	30
293	Tagged	Blue	21

☐ Explain the function head() and how it works with the n argument. Create a memo note, demonstrate learning skill(s) used.

6.2 Selecting Columns

☐ Method 1: Select columns by name using indexing.

Recall that columns can be chosen by index or name.

- By index: field_sightings[, 2] (second column)

- By name : field_sightings[, "Band_Color"]

```
head(subset_blue[ , "Band_Color"])
```

```
## [1] "Blue" "Blue" "Blue" "Blue" "Blue" "Blue"
```

You can combine row + column ideas: band color of the first 10 birds. Type the following code in a new code chunk and run.

```
field_sightings[1:10, "Band_Color"]
```

```
##  [1] "None" "None" "White" "None" "None" "None" "None" "None" "None"
## [10] "None"
```

☐ Why did we use head() in the first chunk and not in the second? Create a memo note, demonstrate learning skill(s) used.

☐ Method 2: Select columns by name using $. Type the following code in a new code chunk and run.

```
Untagged_Birds <- field_sightings$Band_Color[field_sightings$Status == "Untagged"]
```

This creates a vector called Untagged_Birds that contains only the band colors from rows where the status is "Untagged". Type the following code in a new code chunk and run.

```
Tagged_Birds <- field_sightings$Band_Color[field_sightings$Status == "Tagged"]
```

It's particularly useful when you want to:

- Analyze the distribution of "Band_Colors" within each "Status".

- Compare properties between different categories.

- Create separate vectors for further analysis by category.

This creates a vector called Tagged_Birds with only band colors from tagged birds rows.

☐ Bonus: Two conditions + column subset

Use field_sightings: Pick band colors that are White and Status = Tagged. Type the following code in a new code chunk and run.

```
tagged_data <- field_sightings[field_sightings$Status == "Tagged", ]
```

```
white_rows <- which(tagged_data$Band_Color == "White")
```

```
white_tagged <- tagged_data[white_rows, ]
```

7. Insertion

Insertion is the process of adding or modifying values in a data frame. You can insert new values or overwrite existing ones.

7.1 Overwrite Values

Suppose we decide to rename "Untagged" to "Wild_Hatch" in the Status column.

☐ Good practice: make a backup first! Type the following code in a new code chunk and run.

```
# Part 1
reintroduction <- field_sightings        # copy
indices_untagged <- which(field_sightings$Status == "Untagged")
reintroduction[indices_untagged, "Band_Color"] <- "Wild_Hatch"
```

☐ Check-in: Look at the format of that code: x[row, column] <- value. The <- operator is not just for assigning a value to a variable name. <- Wild_Hatch is assigned as the new value "Wild_Hatch" to replace the existing value "Untagged". The column name remains "Status".

```
# Verify the change
unique(reintroduction$Band_Color)
```

```
## [1] "Wild_Hatch" "White"     "Orange"    "Silver"    "Red"
## [6] "Green"      "Yellow"    "Blue"      "Black"
```

☐ Comment: Why is field_sightings unchanged while editing reintroduction? Why is this good practice? Create a memo note, demonstrate learning skill(s) used.
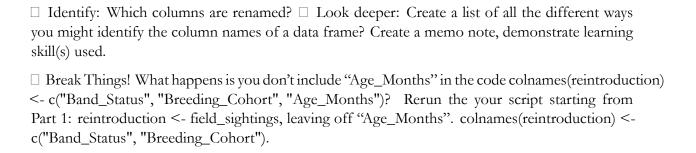
8. Renaming Columns

Example 1: To rename a column, you can use the colnames() function. Type the following code in a new code chunk and run.

```
# Part 2
names(reintroduction)
```

[1] "Status"   "Band_Color" "Age_Months"

```
colnames(reintroduction) <- c("Band_Status", "Breeding_Cohort", "Age_Months")
head(reintroduction)
```

Band_Status	Breeding_Cohort	Age_Months
Untagged	Wild_Hatch	6
Untagged	Wild_Hatch	8
Tagged	White	50
Untagged	Wild_Hatch	1
Untagged	Wild_Hatch	11
Untagged	Wild_Hatch	7

☐ Identify: Which columns are renamed? ☐ Look deeper: Create a list of all the different ways you might identify the column names of a data frame? Create a memo note, demonstrate learning skill(s) used.

☐ Break Things! What happens is you don't include "Age_Months" in the code colnames(reintroduction) <- c("Band_Status", "Breeding_Cohort", "Age_Months")? Rerun the your script starting from Part 1: reintroduction <- field_sightings, leaving off "Age_Months". colnames(reintroduction) <- c("Band_Status", "Breeding_Cohort").

Example 2: You can also rename a specific column by index. Type the following code in a new code chunk and run.

```
reintroduction2 <- field_sightings    # ☐ Always copy first
names(reintroduction2)[which(names(reintroduction2) == "Status")] <- "Band_Status"
names(reintroduction2)[which(names(reintroduction2) == "Band_Color")] <- "Breeding_Cohort"
```

reintroduction2

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	8
Tagged	White	50
Untagged	None	1
Untagged	None	11
Untagged	None	7
Untagged	None	7
Untagged	None	9
Untagged	None	9
Untagged	None	2
Untagged	None	9
Untagged	None	5
Untagged	None	11
Untagged	None	9
Untagged	None	1
Untagged	None	5
Untagged	None	7
Untagged	None	6
Untagged	None	2
Untagged	None	4
Untagged	None	3
Untagged	None	6
Untagged	None	6
Tagged	Orange	54
Untagged	None	6
Untagged	None	0
Untagged	None	9
Untagged	None	3
Untagged	None	3
Untagged	None	5
Untagged	None	4
Untagged	None	2
Untagged	None	11
Untagged	None	4
Untagged	None	7
Untagged	None	6
Untagged	None	9
Untagged	None	4
Untagged	None	3
Untagged	None	3
Untagged	None	4
Untagged	None	5
Untagged	None	5
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	1
Untagged	None	7
Untagged	None	10
Untagged	None	6
Untagged	None	2
Tagged	White	54
Untagged	None	0
Untagged	None	2
Untagged	None	0
Untagged	None	9
Untagged	None	0
Untagged	None	5
Untagged	None	5
Untagged	None	4
Untagged	None	11
Untagged	None	8
Untagged	None	1
Untagged	None	7
Untagged	None	4
Untagged	None	8
Untagged	None	10
Untagged	None	5
Tagged	Silver	33
Untagged	None	5
Untagged	None	11
Untagged	None	1
Untagged	None	4
Untagged	None	6
Untagged	None	10
Tagged	Red	13
Untagged	None	6
Untagged	None	11
Untagged	None	4
Untagged	None	4
Tagged	Orange	49
Untagged	None	8
Untagged	None	6
Tagged	Silver	36
Untagged	None	4
Untagged	None	8
Untagged	None	7
Untagged	None	7
Untagged	None	7
Untagged	None	3
Untagged	None	11
Tagged	Silver	37

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	5
Untagged	None	5
Untagged	None	7
Untagged	None	11
Untagged	None	4
Untagged	None	9
Untagged	None	8
Untagged	None	5
Untagged	None	6
Untagged	None	6
Untagged	None	2
Tagged	Red	12
Untagged	None	11
Untagged	None	8
Untagged	None	8
Untagged	None	11
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	5
Untagged	None	4
Untagged	None	11
Untagged	None	3
Untagged	None	7
Untagged	None	4
Untagged	None	11
Untagged	None	5
Untagged	None	0
Untagged	None	4
Untagged	None	7
Untagged	None	8
Untagged	None	3
Untagged	None	11
Untagged	None	11
Untagged	None	4
Untagged	None	7
Untagged	None	5
Untagged	None	2
Untagged	None	2
Untagged	None	8
Untagged	None	9
Untagged	None	9
Tagged	Green	21
Untagged	None	5
Tagged	Green	21

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Tagged	Green	26
Untagged	None	8
Untagged	None	7
Untagged	None	4
Untagged	None	5
Untagged	None	7
Untagged	None	3
Untagged	None	2
Untagged	None	9
Tagged	Green	25
Untagged	None	8
Untagged	None	5
Untagged	None	11
Untagged	None	2
Untagged	None	4
Untagged	None	9
Untagged	None	5
Untagged	None	6
Untagged	None	10
Untagged	None	11
Untagged	None	4
Untagged	None	0
Untagged	None	3
Untagged	None	3
Untagged	None	5
Tagged	Yellow	30
Untagged	None	9
Untagged	None	7
Untagged	None	1
Untagged	None	3
Untagged	None	6
Untagged	None	8
Untagged	None	8
Untagged	None	7
Untagged	None	1
Untagged	None	6
Untagged	None	6
Untagged	None	2
Untagged	None	0
Untagged	None	11
Untagged	None	5
Untagged	None	5
Untagged	None	7
Untagged	None	9
Tagged	Blue	19

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	11
Untagged	None	3
Tagged	Red	13
Untagged	None	5
Untagged	None	4
Untagged	None	0
Untagged	None	4
Untagged	None	3
Untagged	None	11
Untagged	None	4
Untagged	None	4
Untagged	None	3
Tagged	Black	47
Untagged	None	5
Untagged	None	11
Untagged	None	8
Untagged	None	2
Untagged	None	6
Untagged	None	7
Tagged	Silver	33
Untagged	None	0
Tagged	White	56
Untagged	None	5
Untagged	None	4
Tagged	Blue	30
Untagged	None	1
Tagged	Black	42
Untagged	None	1
Untagged	None	4
Untagged	None	11
Untagged	None	7
Untagged	None	5
Untagged	None	7
Untagged	None	2
Untagged	None	3
Untagged	None	11
Untagged	None	5
Untagged	None	11
Untagged	None	7
Untagged	None	5
Untagged	None	8
Untagged	None	10
Untagged	None	5
Untagged	None	11
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	10
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	4
Tagged	Yellow	29
Untagged	None	7
Untagged	None	11
Untagged	None	3
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	11
Tagged	Green	27
Untagged	None	3
Untagged	None	10
Untagged	None	1
Untagged	None	1
Untagged	None	6
Untagged	None	7
Tagged	Black	44
Untagged	None	3
Untagged	None	0
Untagged	None	5
Untagged	None	0
Tagged	Red	25
Untagged	None	5
Untagged	None	3
Untagged	None	10
Untagged	None	8
Tagged	White	54
Untagged	None	4
Untagged	None	5
Tagged	Yellow	33
Untagged	None	1
Untagged	None	3
Untagged	None	4
Untagged	None	5
Tagged	Silver	39
Untagged	None	10
Untagged	None	7
Untagged	None	6
Untagged	None	4
Untagged	None	8
Untagged	None	11
Untagged	None	1

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	9
Untagged	None	7
Untagged	None	4
Untagged	None	3
Tagged	Orange	49
Untagged	None	6
Tagged	Black	42
Untagged	None	4
Untagged	None	4
Untagged	None	6
Untagged	None	10
Untagged	None	4
Untagged	None	6
Untagged	None	4
Untagged	None	5
Untagged	None	4
Untagged	None	4
Tagged	Blue	21
Untagged	None	4
Untagged	None	6
Untagged	None	5
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	3
Tagged	Orange	45
Untagged	None	8
Untagged	None	9
Untagged	None	6
Untagged	None	4
Untagged	None	4
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	1
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	9
Untagged	None	4
Untagged	None	2
Tagged	Blue	25
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	3
Untagged	None	8
Untagged	None	5
Untagged	None	3
Untagged	None	5
Untagged	None	11
Untagged	None	6
Untagged	None	5
Untagged	None	11
Untagged	None	6
Untagged	None	8
Untagged	None	11
Tagged	Green	27
Untagged	None	0
Untagged	None	4
Untagged	None	2
Untagged	None	0
Untagged	None	9
Untagged	None	8
Untagged	None	3
Untagged	None	11
Untagged	None	6
Untagged	None	4
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	3
Untagged	None	5
Untagged	None	9
Untagged	None	9
Untagged	None	4
Untagged	None	5
Untagged	None	8
Untagged	None	1
Tagged	Green	29
Untagged	None	10
Untagged	None	4
Untagged	None	1
Untagged	None	5
Tagged	White	54
Untagged	None	7
Untagged	None	8
Untagged	None	2
Untagged	None	1

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	6
Untagged	None	0
Untagged	None	1
Untagged	None	2
Untagged	None	3
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	8
Untagged	None	2
Untagged	None	5
Untagged	None	1
Untagged	None	10
Untagged	None	4
Tagged	Black	44
Untagged	None	6
Untagged	None	8
Untagged	None	8
Untagged	None	10
Untagged	None	6
Untagged	None	2
Untagged	None	6
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	9
Untagged	None	11
Untagged	None	2
Tagged	Red	16
Untagged	None	7
Untagged	None	4
Untagged	None	3
Untagged	None	5
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	10
Untagged	None	7
Untagged	None	3
Untagged	None	11
Untagged	None	11
Untagged	None	10
Untagged	None	7
Untagged	None	9
Untagged	None	8

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	7
Untagged	None	8
Untagged	None	5
Tagged	White	61
Untagged	None	10
Tagged	Orange	43
Untagged	None	7
Untagged	None	2
Untagged	None	8
Untagged	None	8
Untagged	None	6
Tagged	Orange	48
Untagged	None	6
Untagged	None	4
Untagged	None	10
Untagged	None	7
Untagged	None	9
Untagged	None	11
Untagged	None	3
Untagged	None	8
Untagged	None	5
Tagged	White	55
Untagged	None	4
Untagged	None	9
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	5
Untagged	None	9
Untagged	None	3
Untagged	None	8
Untagged	None	10
Untagged	None	0
Untagged	None	3
Untagged	None	4
Untagged	None	7
Tagged	Green	28
Untagged	None	10
Tagged	White	48
Untagged	None	7
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	6
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	2
Untagged	None	9
Untagged	None	2
Untagged	None	7
Untagged	None	11
Untagged	None	5
Untagged	None	5
Tagged	Green	26
Untagged	None	0
Untagged	None	6
Untagged	None	6
Untagged	None	1
Untagged	None	8
Untagged	None	9
Untagged	None	3
Tagged	White	60
Untagged	None	8
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	3
Untagged	None	6
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	5
Untagged	None	4
Untagged	None	10
Untagged	None	0
Untagged	None	10
Untagged	None	0
Untagged	None	6
Tagged	White	55
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	4
Untagged	None	7
Untagged	None	4
Untagged	None	7
Untagged	None	0
Untagged	None	8
Tagged	Blue	17
Tagged	Orange	50
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	8
Untagged	None	5
Untagged	None	8
Untagged	None	8
Untagged	None	6
Untagged	None	5
Untagged	None	5
Untagged	None	10
Untagged	None	1
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	3
Untagged	None	0
Untagged	None	3
Untagged	None	3
Untagged	None	1
Untagged	None	5
Tagged	Silver	40
Untagged	None	4
Untagged	None	5
Untagged	None	11
Untagged	None	10
Untagged	None	4
Untagged	None	5
Untagged	None	8
Tagged	Red	12
Untagged	None	8
Untagged	None	7
Untagged	None	4
Untagged	None	5
Untagged	None	7
Untagged	None	7
Untagged	None	10
Untagged	None	3
Untagged	None	10
Untagged	None	8
Untagged	None	10
Untagged	None	4
Untagged	None	10
Untagged	None	6
Untagged	None	11
Untagged	None	6
Untagged	None	5
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Tagged	Silver	38
Untagged	None	4
Untagged	None	2
Untagged	None	7
Untagged	None	5
Tagged	Black	37
Tagged	Red	12
Untagged	None	8
Untagged	None	6
Untagged	None	8
Untagged	None	10
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	8
Tagged	Yellow	29
Tagged	Silver	38
Untagged	None	10
Untagged	None	7
Untagged	None	8
Untagged	None	9
Untagged	None	4
Untagged	None	0
Untagged	None	3
Untagged	None	4
Untagged	None	3
Untagged	None	10
Untagged	None	8
Untagged	None	2
Untagged	None	4
Untagged	None	3
Untagged	None	7
Tagged	Silver	43
Untagged	None	9
Untagged	None	11
Untagged	None	0
Untagged	None	11
Untagged	None	6
Untagged	None	8
Untagged	None	7
Tagged	Orange	42
Untagged	None	6
Untagged	None	6
Untagged	None	5
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	9
Untagged	None	5
Untagged	None	3
Untagged	None	7
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	2
Untagged	None	4
Untagged	None	8
Untagged	None	6
Untagged	None	9
Untagged	None	0
Untagged	None	4
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	5
Untagged	None	4
Untagged	None	7
Untagged	None	6
Untagged	None	11
Untagged	None	9
Untagged	None	3
Untagged	None	10
Untagged	None	9
Untagged	None	1
Untagged	None	6
Tagged	Orange	50
Untagged	None	11
Untagged	None	4
Untagged	None	5
Untagged	None	10
Untagged	None	10
Untagged	None	4
Tagged	Yellow	35
Tagged	Blue	19
Untagged	None	6
Tagged	Blue	22
Untagged	None	5
Untagged	None	10
Untagged	None	3
Untagged	None	5
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Tagged	White	53
Untagged	None	10
Untagged	None	4
Untagged	None	10
Untagged	None	8
Untagged	None	6
Untagged	None	7
Tagged	Silver	38
Untagged	None	5
Untagged	None	11
Untagged	None	5
Untagged	None	5
Untagged	None	10
Untagged	None	7
Untagged	None	5
Untagged	None	10
Untagged	None	7
Tagged	Green	29
Untagged	None	4
Untagged	None	2
Untagged	None	7
Untagged	None	3
Untagged	None	8
Untagged	None	10
Untagged	None	8
Untagged	None	7
Tagged	Black	46
Untagged	None	1
Tagged	Green	27
Untagged	None	9
Untagged	None	8
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	8
Tagged	Blue	23
Untagged	None	4
Untagged	None	7
Untagged	None	2
Untagged	None	11
Untagged	None	8
Tagged	Silver	30
Untagged	None	2
Untagged	None	10
Untagged	None	5
Untagged	None	2

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	7
Untagged	None	3
Untagged	None	4
Untagged	None	10
Untagged	None	3
Untagged	None	3
Untagged	None	4
Untagged	None	9
Untagged	None	2
Untagged	None	9
Untagged	None	6
Untagged	None	1
Untagged	None	5
Untagged	None	3
Untagged	None	7
Untagged	None	4
Untagged	None	8
Untagged	None	7
Untagged	None	7
Tagged	Green	22
Untagged	None	1
Untagged	None	7
Untagged	None	7
Untagged	None	3
Untagged	None	3
Untagged	None	6
Untagged	None	11
Untagged	None	5
Untagged	None	5
Untagged	None	11
Untagged	None	5
Untagged	None	5
Untagged	None	0
Untagged	None	2
Untagged	None	6
Untagged	None	5
Untagged	None	2
Tagged	White	53
Untagged	None	11
Tagged	Orange	51
Untagged	None	9
Untagged	None	8
Untagged	None	9
Untagged	None	7
Tagged	Black	45
Untagged	None	2

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	5
Tagged	Orange	48
Tagged	Blue	18
Untagged	None	4
Untagged	None	0
Untagged	None	7
Tagged	White	52
Untagged	None	3
Untagged	None	2
Untagged	None	9
Untagged	None	6
Tagged	Blue	17
Untagged	None	7
Untagged	None	8
Untagged	None	2
Untagged	None	5
Tagged	Black	42
Tagged	Green	31
Untagged	None	4
Untagged	None	11
Untagged	None	3
Untagged	None	6
Untagged	None	4
Untagged	None	3
Untagged	None	7
Untagged	None	0
Untagged	None	6
Untagged	None	7
Untagged	None	5
Untagged	None	4
Untagged	None	7
Untagged	None	4
Untagged	None	5
Untagged	None	4
Tagged	Orange	54
Untagged	None	5
Untagged	None	8
Untagged	None	2
Untagged	None	5
Untagged	None	3
Untagged	None	11
Untagged	None	4
Untagged	None	5
Untagged	None	8
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	1
Tagged	Green	26
Untagged	None	2
Untagged	None	10
Untagged	None	3
Untagged	None	6
Untagged	None	3
Untagged	None	9
Untagged	None	3
Untagged	None	6
Tagged	White	56
Untagged	None	5
Untagged	None	9
Untagged	None	3
Untagged	None	2
Untagged	None	9
Untagged	None	1
Untagged	None	4
Untagged	None	6
Tagged	Yellow	28
Tagged	Blue	21
Untagged	None	9
Untagged	None	11
Tagged	Orange	48
Untagged	None	4
Untagged	None	6
Untagged	None	7
Tagged	White	57
Untagged	None	5
Untagged	None	3
Untagged	None	6
Untagged	None	8
Untagged	None	11
Untagged	None	5
Untagged	None	7
Untagged	None	3
Untagged	None	6
Untagged	None	9
Untagged	None	2
Untagged	None	7
Untagged	None	10
Untagged	None	4
Untagged	None	11
Untagged	None	4
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	7
Untagged	None	5
Untagged	None	10
Untagged	None	7
Untagged	None	4
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	0
Untagged	None	8
Untagged	None	11
Untagged	None	3
Untagged	None	4
Untagged	None	5
Untagged	None	6
Untagged	None	4
Untagged	None	2
Untagged	None	7
Untagged	None	9
Untagged	None	0
Untagged	None	7
Untagged	None	5
Untagged	None	3
Untagged	None	6
Untagged	None	7
Tagged	Green	24
Untagged	None	11
Untagged	None	0
Untagged	None	8
Untagged	None	8
Untagged	None	7
Untagged	None	4
Untagged	None	4
Untagged	None	6
Untagged	None	6
Untagged	None	7
Untagged	None	2
Untagged	None	11
Untagged	None	0
Untagged	None	2
Untagged	None	11
Tagged	White	56
Untagged	None	5
Untagged	None	4
Untagged	None	11

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	9
Tagged	Black	49
Untagged	None	10
Untagged	None	8
Untagged	None	7
Untagged	None	3
Untagged	None	11
Untagged	None	8
Untagged	None	7
Untagged	None	1
Untagged	None	7
Untagged	None	8
Untagged	None	2
Tagged	Yellow	36
Untagged	None	10
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	4
Untagged	None	6
Untagged	None	1
Untagged	None	9
Untagged	None	0
Untagged	None	7
Untagged	None	7
Untagged	None	6
Tagged	Blue	20
Untagged	None	3
Untagged	None	9
Untagged	None	9
Untagged	None	8
Untagged	None	4
Untagged	None	5
Untagged	None	7
Untagged	None	4
Untagged	None	6
Tagged	White	59
Untagged	None	7
Untagged	None	6
Untagged	None	10
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	2
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Tagged	White	57
Untagged	None	0
Untagged	None	9
Untagged	None	6
Untagged	None	9
Untagged	None	9
Untagged	None	5
Untagged	None	6
Untagged	None	5
Untagged	None	8
Untagged	None	9
Untagged	None	9
Untagged	None	5
Untagged	None	4
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	1
Untagged	None	11
Untagged	None	0
Untagged	None	2
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	4
Untagged	None	6
Untagged	None	7
Untagged	None	9
Untagged	None	7
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	1
Untagged	None	6
Tagged	Orange	49
Untagged	None	4
Untagged	None	1
Untagged	None	6
Untagged	None	3
Untagged	None	4
Tagged	Green	31
Untagged	None	9
Untagged	None	4
Untagged	None	7
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	7
Untagged	None	11
Untagged	None	6
Untagged	None	6
Untagged	None	6
Tagged	Orange	51
Untagged	None	5
Untagged	None	8
Untagged	None	6
Untagged	None	4
Tagged	Blue	18
Untagged	None	9
Untagged	None	8
Untagged	None	4
Untagged	None	7
Untagged	None	7
Untagged	None	5
Untagged	None	5
Untagged	None	6
Untagged	None	6
Untagged	None	11
Untagged	None	8
Untagged	None	7
Untagged	None	7
Untagged	None	8
Untagged	None	9
Untagged	None	6
Untagged	None	5
Untagged	None	4
Untagged	None	5
Tagged	Yellow	25
Tagged	Red	12
Untagged	None	3
Untagged	None	9
Tagged	Green	24
Untagged	None	7
Untagged	None	4
Untagged	None	7
Untagged	None	7
Untagged	None	5
Tagged	Orange	50
Untagged	None	2
Untagged	None	11
Untagged	None	10
Untagged	None	4
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	0
Untagged	None	4
Tagged	Green	25
Untagged	None	4
Untagged	None	3
Untagged	None	8
Untagged	None	3
Untagged	None	10
Untagged	None	1
Untagged	None	10
Untagged	None	8
Tagged	White	52
Tagged	Yellow	34
Untagged	None	4
Untagged	None	5
Untagged	None	10
Tagged	Red	17
Untagged	None	10
Untagged	None	3
Tagged	Red	20
Untagged	None	8
Untagged	None	6
Tagged	Yellow	31
Untagged	None	3
Tagged	Yellow	36
Untagged	None	0
Untagged	None	5
Untagged	None	3
Untagged	None	5
Untagged	None	6
Tagged	Black	44
Untagged	None	9
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	2
Untagged	None	2
Tagged	Orange	50
Untagged	None	4
Untagged	None	8
Untagged	None	10
Untagged	None	11
Untagged	None	6
Untagged	None	2
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Tagged	Red	13
Untagged	None	0
Untagged	None	1
Untagged	None	11
Untagged	None	0
Untagged	None	5
Untagged	None	7
Untagged	None	9
Untagged	None	7
Untagged	None	5
Untagged	None	7
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	10
Untagged	None	6
Untagged	None	11
Untagged	None	0
Untagged	None	4
Untagged	None	5
Untagged	None	6
Untagged	None	8
Untagged	None	7
Untagged	None	2
Untagged	None	9
Untagged	None	6
Untagged	None	6
Untagged	None	11
Untagged	None	9
Untagged	None	4
Untagged	None	4
Untagged	None	4
Untagged	None	5
Tagged	White	59
Untagged	None	8
Untagged	None	8
Untagged	None	10
Untagged	None	1
Untagged	None	8
Untagged	None	11
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	5
Untagged	None	8
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	8
Tagged	Orange	48
Untagged	None	5
Tagged	Green	27
Untagged	None	5
Untagged	None	9
Untagged	None	5
Untagged	None	6
Untagged	None	2
Untagged	None	9
Untagged	None	9
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	2
Untagged	None	4
Untagged	None	4
Untagged	None	8
Untagged	None	8
Untagged	None	8
Untagged	None	2
Untagged	None	4
Untagged	None	4
Untagged	None	1
Untagged	None	9
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	7
Untagged	None	5
Tagged	Silver	40
Untagged	None	4
Untagged	None	10
Untagged	None	6
Untagged	None	4
Untagged	None	7
Untagged	None	6
Untagged	None	2
Untagged	None	9
Untagged	None	4
Tagged	Black	45
Untagged	None	11
Untagged	None	4
Untagged	None	10
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	7
Untagged	None	4
Tagged	Yellow	33
Untagged	None	4
Untagged	None	8
Untagged	None	6
Untagged	None	7
Untagged	None	3
Tagged	Yellow	29
Untagged	None	6
Untagged	None	8
Untagged	None	5
Untagged	None	5
Untagged	None	5
Untagged	None	2
Untagged	None	8
Untagged	None	4
Untagged	None	2
Untagged	None	8
Untagged	None	7
Tagged	Orange	53
Untagged	None	7
Untagged	None	8
Untagged	None	5
Untagged	None	11
Untagged	None	6
Untagged	None	10
Tagged	Red	14
Untagged	None	0
Untagged	None	4
Untagged	None	9
Untagged	None	2
Untagged	None	0
Untagged	None	6
Tagged	Yellow	31
Untagged	None	5
Untagged	None	0
Untagged	None	3
Untagged	None	8
Tagged	Silver	39
Untagged	None	7
Untagged	None	5
Untagged	None	9
Untagged	None	6
Untagged	None	3
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	7
Untagged	None	1
Untagged	None	3
Untagged	None	9
Untagged	None	3
Untagged	None	5
Untagged	None	6
Untagged	None	6
Untagged	None	10
Untagged	None	7
Untagged	None	1
Untagged	None	2
Untagged	None	2
Untagged	None	0
Untagged	None	1
Untagged	None	10
Untagged	None	7
Untagged	None	6
Untagged	None	11
Untagged	None	7
Untagged	None	5
Untagged	None	2
Untagged	None	8
Untagged	None	9
Untagged	None	9
Untagged	None	1
Untagged	None	6
Untagged	None	2
Untagged	None	1
Untagged	None	6
Untagged	None	4
Untagged	None	6
Untagged	None	8
Untagged	None	6
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	2
Untagged	None	6
Untagged	None	5
Untagged	None	1
Untagged	None	5
Untagged	None	10
Untagged	None	4
Untagged	None	2
Untagged	None	10

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	7
Untagged	None	6
Untagged	None	9
Untagged	None	3
Tagged	Silver	36
Untagged	None	7
Untagged	None	7
Untagged	None	4
Untagged	None	10
Untagged	None	11
Untagged	None	5
Untagged	None	7
Untagged	None	7
Untagged	None	2
Untagged	None	7
Untagged	None	4
Tagged	Blue	22
Untagged	None	8
Untagged	None	8
Untagged	None	11
Untagged	None	7
Untagged	None	3
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	6
Untagged	None	10
Untagged	None	9
Untagged	None	8
Untagged	None	6
Untagged	None	9
Untagged	None	8
Untagged	None	1
Untagged	None	5
Untagged	None	3
Untagged	None	4
Tagged	Orange	45
Untagged	None	7
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	6
Untagged	None	6
Untagged	None	8

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	4
Untagged	None	1
Untagged	None	2
Untagged	None	4
Untagged	None	7
Untagged	None	11
Untagged	None	7
Untagged	None	3
Untagged	None	9
Untagged	None	8
Untagged	None	7
Untagged	None	10
Untagged	None	6
Untagged	None	3
Untagged	None	2
Untagged	None	4
Untagged	None	9
Untagged	None	8
Tagged	Red	14
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	5
Untagged	None	5
Untagged	None	7
Untagged	None	9
Untagged	None	4
Untagged	None	10
Untagged	None	5
Untagged	None	8
Untagged	None	9
Untagged	None	3
Untagged	None	7
Untagged	None	8
Untagged	None	11
Untagged	None	7
Untagged	None	5
Untagged	None	3
Untagged	None	7
Untagged	None	4
Untagged	None	3
Tagged	Black	42
Untagged	None	7
Untagged	None	7
Untagged	None	0

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	0
Tagged	Blue	27
Untagged	None	0
Untagged	None	10
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	8
Untagged	None	1
Tagged	Red	18
Untagged	None	10
Untagged	None	4
Untagged	None	2
Untagged	None	6
Untagged	None	0
Untagged	None	4
Untagged	None	8
Untagged	None	5
Untagged	None	7
Untagged	None	10
Untagged	None	0
Untagged	None	7
Untagged	None	10
Untagged	None	5
Untagged	None	8
Untagged	None	1
Untagged	None	7
Untagged	None	2
Untagged	None	0
Untagged	None	5
Untagged	None	9
Untagged	None	11
Tagged	White	53
Untagged	None	5
Untagged	None	3
Untagged	None	11
Untagged	None	4
Untagged	None	5
Untagged	None	7
Untagged	None	8
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	5
Untagged	None	8

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	9
Untagged	None	8
Untagged	None	5
Untagged	None	10
Untagged	None	4
Untagged	None	8
Untagged	None	11
Untagged	None	7
Untagged	None	3
Untagged	None	6
Untagged	None	11
Untagged	None	10
Untagged	None	6
Untagged	None	5
Untagged	None	4
Untagged	None	7
Untagged	None	2
Untagged	None	9
Untagged	None	5
Untagged	None	7
Untagged	None	5
Untagged	None	10
Untagged	None	4
Untagged	None	6
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	8
Untagged	None	8
Untagged	None	11
Untagged	None	7
Untagged	None	9
Tagged	Silver	41
Untagged	None	7
Untagged	None	10
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Tagged	Red	16
Untagged	None	6
Untagged	None	4
Untagged	None	3
Untagged	None	1
Untagged	None	7
Untagged	None	11
Untagged	None	4
Untagged	None	7
Untagged	None	7
Untagged	None	7
Untagged	None	1
Untagged	None	6
Untagged	None	1
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	7
Tagged	Orange	53
Untagged	None	3
Untagged	None	5
Untagged	None	4
Untagged	None	5
Untagged	None	6
Untagged	None	7
Tagged	Yellow	35
Untagged	None	9
Untagged	None	5
Untagged	None	10
Untagged	None	3
Untagged	None	10
Tagged	Blue	25
Untagged	None	8
Untagged	None	5
Untagged	None	6
Untagged	None	3
Untagged	None	11
Untagged	None	7
Untagged	None	6
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	6
Untagged	None	4
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	1
Untagged	None	8
Untagged	None	9
Untagged	None	8
Untagged	None	10
Untagged	None	3
Untagged	None	7
Untagged	None	7
Untagged	None	9
Untagged	None	11
Untagged	None	7
Untagged	None	3
Untagged	None	11
Untagged	None	2
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	8
Untagged	None	2
Untagged	None	2
Untagged	None	7
Tagged	Green	23
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	7
Untagged	None	9
Untagged	None	4
Untagged	None	5
Tagged	Yellow	31
Untagged	None	11
Untagged	None	6
Untagged	None	2
Untagged	None	5
Tagged	Blue	20
Untagged	None	3
Untagged	None	7
Tagged	Green	30
Untagged	None	8
Untagged	None	5
Untagged	None	6
Untagged	None	4
Untagged	None	7
Tagged	Orange	52
Untagged	None	10
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	2
Untagged	None	5
Untagged	None	2
Untagged	None	8
Untagged	None	5
Tagged	Green	26
Untagged	None	4
Untagged	None	10
Untagged	None	8
Tagged	Black	42
Untagged	None	4
Untagged	None	11
Untagged	None	2
Untagged	None	6
Untagged	None	7
Untagged	None	4
Tagged	Orange	52
Tagged	Silver	34
Untagged	None	4
Untagged	None	5
Untagged	None	8
Untagged	None	3
Untagged	None	8
Untagged	None	7
Untagged	None	11
Untagged	None	11
Untagged	None	8
Untagged	None	11
Untagged	None	6
Untagged	None	11
Untagged	None	2
Untagged	None	10
Untagged	None	5
Untagged	None	3
Untagged	None	9
Untagged	None	4
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	9
Untagged	None	2
Untagged	None	9
Untagged	None	4
Untagged	None	9
Untagged	None	5
Untagged	None	11

Band_Status	Breeding_Cohort	Age_Months
Tagged	Silver	36
Untagged	None	6
Untagged	None	9
Tagged	Red	12
Tagged	Silver	40
Untagged	None	6
Untagged	None	10
Tagged	White	51
Untagged	None	2
Untagged	None	9
Untagged	None	2
Untagged	None	8
Untagged	None	11
Untagged	None	10
Untagged	None	7
Untagged	None	5
Untagged	None	6
Untagged	None	10
Untagged	None	11
Untagged	None	9
Untagged	None	3
Untagged	None	4
Untagged	None	7
Untagged	None	4
Untagged	None	7
Untagged	None	1
Untagged	None	4
Untagged	None	8
Untagged	None	10
Untagged	None	5
Untagged	None	7
Untagged	None	8
Tagged	Yellow	27
Untagged	None	9
Untagged	None	0
Tagged	Blue	14
Untagged	None	11
Untagged	None	9
Untagged	None	2
Untagged	None	11
Tagged	Yellow	29
Tagged	Red	17
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	5
Untagged	None	7
Untagged	None	4
Untagged	None	9
Tagged	Black	50
Untagged	None	6
Untagged	None	4
Untagged	None	2
Untagged	None	1
Untagged	None	9
Untagged	None	8
Untagged	None	11
Untagged	None	5
Untagged	None	0
Untagged	None	8
Tagged	Yellow	39
Untagged	None	0
Untagged	None	4
Untagged	None	11
Untagged	None	3
Untagged	None	11
Untagged	None	2
Untagged	None	5
Untagged	None	9
Untagged	None	10
Untagged	None	5
Untagged	None	8
Untagged	None	4
Tagged	Orange	43
Untagged	None	6
Untagged	None	11
Untagged	None	7
Untagged	None	3
Untagged	None	0
Untagged	None	9
Untagged	None	11
Untagged	None	4
Untagged	None	5
Untagged	None	6
Untagged	None	10
Untagged	None	3
Untagged	None	8
Untagged	None	5
Untagged	None	11
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	4
Untagged	None	6
Untagged	None	9
Untagged	None	0
Untagged	None	6
Untagged	None	4
Untagged	None	8
Untagged	None	3
Untagged	None	6
Untagged	None	8
Untagged	None	3
Untagged	None	8
Untagged	None	8
Untagged	None	4
Untagged	None	6
Untagged	None	4
Untagged	None	11
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	0
Untagged	None	5
Untagged	None	11
Tagged	White	54
Untagged	None	4
Untagged	None	3
Untagged	None	10
Untagged	None	7
Untagged	None	4
Untagged	None	6
Untagged	None	8
Untagged	None	6
Untagged	None	9
Untagged	None	8
Untagged	None	9
Tagged	Red	12
Untagged	None	1
Untagged	None	7
Untagged	None	3
Untagged	None	0
Untagged	None	7
Untagged	None	6
Tagged	Red	16
Untagged	None	6
Untagged	None	4

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	8
Tagged	Silver	38
Untagged	None	9
Untagged	None	6
Untagged	None	6
Untagged	None	10
Untagged	None	4
Untagged	None	2
Untagged	None	6
Untagged	None	5
Untagged	None	4
Untagged	None	11
Untagged	None	10
Untagged	None	7
Tagged	Red	17
Untagged	None	3
Untagged	None	1
Untagged	None	5
Untagged	None	5
Untagged	None	9
Untagged	None	8
Untagged	None	10
Untagged	None	10
Untagged	None	1
Untagged	None	0
Untagged	None	7
Tagged	Orange	50
Untagged	None	0
Untagged	None	2
Untagged	None	9
Untagged	None	2
Untagged	None	5
Tagged	White	58
Untagged	None	3
Untagged	None	11
Untagged	None	5
Untagged	None	3
Untagged	None	3
Untagged	None	2
Tagged	Black	47
Untagged	None	0
Untagged	None	2
Untagged	None	7
Untagged	None	4
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	8
Untagged	None	7
Untagged	None	10
Untagged	None	7
Untagged	None	11
Untagged	None	9
Untagged	None	5
Untagged	None	9
Untagged	None	8
Untagged	None	10
Untagged	None	2
Untagged	None	9
Untagged	None	4
Untagged	None	4
Untagged	None	10
Untagged	None	2
Untagged	None	4
Untagged	None	5
Untagged	None	5
Untagged	None	11
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	5
Untagged	None	1
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	5
Untagged	None	1
Untagged	None	2
Untagged	None	6
Untagged	None	2
Untagged	None	9
Untagged	None	9
Untagged	None	2
Untagged	None	2
Untagged	None	6
Untagged	None	5
Untagged	None	9
Untagged	None	3
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	2
Untagged	None	9
Untagged	None	3
Untagged	None	3
Untagged	None	4
Untagged	None	2
Untagged	None	7
Untagged	None	8
Untagged	None	9
Untagged	None	8
Untagged	None	2
Untagged	None	11
Untagged	None	6
Untagged	None	9
Untagged	None	10
Untagged	None	4
Untagged	None	11
Untagged	None	4
Untagged	None	7
Untagged	None	11
Untagged	None	9
Untagged	None	4
Tagged	Green	22
Untagged	None	5
Untagged	None	4
Untagged	None	7
Untagged	None	8
Untagged	None	3
Untagged	None	0
Untagged	None	2
Tagged	White	56
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	0
Tagged	Yellow	37
Untagged	None	5
Untagged	None	6
Untagged	None	4
Untagged	None	2
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	10
Untagged	None	0
Tagged	White	61
Untagged	None	0
Untagged	None	5
Tagged	White	60
Untagged	None	8
Untagged	None	8
Untagged	None	2
Untagged	None	10
Untagged	None	3
Untagged	None	7
Untagged	None	9
Untagged	None	8
Untagged	None	7
Tagged	White	60
Untagged	None	4
Untagged	None	3
Untagged	None	1
Untagged	None	5
Tagged	Red	14
Untagged	None	11
Untagged	None	8
Untagged	None	9
Untagged	None	1
Untagged	None	2
Untagged	None	1
Tagged	White	58
Untagged	None	4
Untagged	None	8
Untagged	None	11
Untagged	None	7
Tagged	Silver	39
Untagged	None	11
Untagged	None	8
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	6
Untagged	None	7
Untagged	None	10
Untagged	None	1
Untagged	None	3
Untagged	None	9
Untagged	None	5
Untagged	None	11

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	10
Untagged	None	9
Untagged	None	7
Untagged	None	9
Tagged	Silver	38
Untagged	None	9
Untagged	None	7
Untagged	None	6
Untagged	None	11
Untagged	None	8
Untagged	None	5
Untagged	None	9
Untagged	None	5
Untagged	None	7
Untagged	None	6
Untagged	None	9
Tagged	Black	41
Tagged	Blue	16
Untagged	None	10
Untagged	None	7
Untagged	None	8
Untagged	None	10
Untagged	None	5
Untagged	None	5
Untagged	None	9
Untagged	None	1
Untagged	None	6
Untagged	None	4
Untagged	None	3
Untagged	None	1
Untagged	None	5
Untagged	None	4
Untagged	None	5
Untagged	None	6
Untagged	None	8
Untagged	None	8
Untagged	None	9
Untagged	None	11
Untagged	None	5
Untagged	None	7
Untagged	None	0
Untagged	None	4
Tagged	Blue	16
Untagged	None	5
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	8
Untagged	None	8
Tagged	Green	29
Untagged	None	5
Untagged	None	10
Tagged	Orange	47
Untagged	None	6
Untagged	None	4
Untagged	None	7
Untagged	None	5
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	11
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	0
Untagged	None	1
Untagged	None	5
Untagged	None	11
Untagged	None	11
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	3
Untagged	None	9
Untagged	None	6
Untagged	None	7
Untagged	None	8
Untagged	None	7
Untagged	None	5
Untagged	None	2
Untagged	None	4
Untagged	None	0
Untagged	None	7
Untagged	None	2
Untagged	None	0
Untagged	None	7
Untagged	None	6
Untagged	None	1
Untagged	None	2
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	4
Untagged	None	6
Untagged	None	1
Untagged	None	3
Untagged	None	8
Untagged	None	11
Untagged	None	6
Untagged	None	9
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	9
Tagged	White	54
Untagged	None	8
Untagged	None	8
Untagged	None	11
Untagged	None	5
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	5
Untagged	None	6
Untagged	None	9
Untagged	None	6
Untagged	None	5
Untagged	None	2
Untagged	None	4
Untagged	None	11
Untagged	None	9
Untagged	None	2
Untagged	None	10
Untagged	None	3
Untagged	None	5
Untagged	None	11
Untagged	None	2
Untagged	None	5
Untagged	None	4
Untagged	None	8
Untagged	None	9
Untagged	None	5
Untagged	None	6
Untagged	None	4
Tagged	Black	45

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	8
Untagged	None	2
Untagged	None	5
Untagged	None	9
Untagged	None	3
Untagged	None	3
Untagged	None	6
Untagged	None	6
Untagged	None	8
Untagged	None	4
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	4
Tagged	Green	31
Untagged	None	3
Untagged	None	4
Tagged	Green	23
Untagged	None	3
Untagged	None	4
Untagged	None	8
Untagged	None	2
Tagged	Orange	47
Untagged	None	11
Untagged	None	2
Untagged	None	9
Untagged	None	2
Untagged	None	3
Untagged	None	7
Untagged	None	7
Untagged	None	7
Untagged	None	7
Tagged	Orange	53
Untagged	None	6
Untagged	None	3
Untagged	None	4
Untagged	None	2
Untagged	None	0
Untagged	None	11
Untagged	None	5
Untagged	None	10
Untagged	None	8
Untagged	None	2
Untagged	None	0
Tagged	Green	24

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	7
Untagged	None	4
Untagged	None	4
Untagged	None	5
Untagged	None	9
Untagged	None	4
Tagged	Silver	41
Untagged	None	9
Untagged	None	8
Untagged	None	0
Untagged	None	8
Untagged	None	9
Untagged	None	11
Untagged	None	9
Tagged	White	57
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	5
Untagged	None	8
Untagged	None	3
Untagged	None	2
Untagged	None	6
Tagged	Black	41
Untagged	None	3
Untagged	None	5
Untagged	None	4
Untagged	None	5
Untagged	None	9
Untagged	None	3
Untagged	None	5
Untagged	None	5
Untagged	None	5
Untagged	None	4
Untagged	None	6
Untagged	None	2
Untagged	None	4
Untagged	None	4
Untagged	None	8
Untagged	None	3
Untagged	None	10
Untagged	None	9
Untagged	None	5
Untagged	None	7
Untagged	None	2

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	1
Untagged	None	8
Untagged	None	4
Untagged	None	0
Untagged	None	6
Untagged	None	6
Untagged	None	8
Untagged	None	5
Tagged	Black	44
Untagged	None	11
Untagged	None	0
Tagged	Green	22
Untagged	None	6
Untagged	None	8
Untagged	None	9
Untagged	None	5
Tagged	Blue	22
Tagged	Black	48
Tagged	Yellow	32
Untagged	None	6
Untagged	None	11
Tagged	Red	14
Untagged	None	2
Untagged	None	9
Untagged	None	4
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	6
Untagged	None	6
Untagged	None	7
Untagged	None	3
Untagged	None	3
Untagged	None	6
Untagged	None	4
Untagged	None	6
Untagged	None	2
Untagged	None	3
Untagged	None	6
Untagged	None	8
Untagged	None	8
Untagged	None	7
Untagged	None	10
Untagged	None	8
Untagged	None	7
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	7
Tagged	Black	44
Untagged	None	10
Untagged	None	5
Untagged	None	2
Untagged	None	7
Tagged	Black	48
Untagged	None	5
Untagged	None	5
Untagged	None	3
Tagged	Blue	21
Untagged	None	10
Untagged	None	5
Untagged	None	6
Untagged	None	3
Untagged	None	2
Untagged	None	1
Untagged	None	10
Untagged	None	3
Untagged	None	3
Untagged	None	5
Tagged	Black	41
Untagged	None	8
Untagged	None	8
Untagged	None	4
Untagged	None	6
Untagged	None	7
Tagged	White	57
Untagged	None	2
Untagged	None	6
Untagged	None	7
Untagged	None	9
Untagged	None	4
Untagged	None	2
Untagged	None	2
Untagged	None	9
Untagged	None	5
Untagged	None	4
Untagged	None	5
Untagged	None	7
Untagged	None	4
Untagged	None	6
Untagged	None	11
Untagged	None	1
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	6
Untagged	None	7
Untagged	None	7
Untagged	None	7
Tagged	Blue	16
Untagged	None	8
Untagged	None	11
Untagged	None	4
Untagged	None	10
Untagged	None	8
Untagged	None	0
Untagged	None	6
Untagged	None	6
Untagged	None	0
Untagged	None	0
Untagged	None	2
Untagged	None	9
Untagged	None	5
Untagged	None	0
Untagged	None	9
Untagged	None	8
Untagged	None	11
Untagged	None	9
Untagged	None	4
Untagged	None	3
Untagged	None	5
Untagged	None	9
Untagged	None	11
Untagged	None	0
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	7
Untagged	None	7
Untagged	None	7
Untagged	None	3
Untagged	None	5
Untagged	None	3
Untagged	None	5
Untagged	None	1
Untagged	None	4
Tagged	White	53
Untagged	None	4
Untagged	None	5
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	2
Untagged	None	7
Untagged	None	6
Untagged	None	8
Untagged	None	5
Untagged	None	6
Untagged	None	11
Tagged	Black	42
Untagged	None	4
Untagged	None	10
Untagged	None	5
Untagged	None	7
Untagged	None	5
Untagged	None	7
Untagged	None	3
Untagged	None	8
Untagged	None	9
Untagged	None	7
Untagged	None	5
Untagged	None	0
Untagged	None	7
Untagged	None	10
Untagged	None	4
Untagged	None	5
Untagged	None	10
Untagged	None	5
Untagged	None	7
Untagged	None	11
Tagged	Red	17
Untagged	None	10
Untagged	None	11
Untagged	None	8
Untagged	None	5
Untagged	None	9
Untagged	None	10
Untagged	None	8
Untagged	None	9
Untagged	None	5
Untagged	None	9
Untagged	None	0
Tagged	Silver	38
Tagged	Orange	50
Untagged	None	5
Tagged	Blue	24
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	4
Untagged	None	2
Untagged	None	11
Untagged	None	8
Untagged	None	6
Untagged	None	3
Untagged	None	9
Untagged	None	6
Untagged	None	4
Untagged	None	6
Untagged	None	4
Untagged	None	10
Untagged	None	3
Tagged	Blue	20
Untagged	None	1
Untagged	None	2
Untagged	None	2
Untagged	None	10
Untagged	None	3
Untagged	None	11
Untagged	None	11
Untagged	None	9
Untagged	None	6
Untagged	None	10
Untagged	None	3
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	3
Untagged	None	2
Untagged	None	6
Untagged	None	8
Untagged	None	2
Untagged	None	5
Untagged	None	6
Untagged	None	6
Tagged	Blue	21
Untagged	None	2
Untagged	None	4
Untagged	None	9
Untagged	None	3
Untagged	None	4
Untagged	None	6
Untagged	None	8

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	6
Untagged	None	8
Untagged	None	10
Untagged	None	2
Untagged	None	2
Untagged	None	4
Untagged	None	8
Untagged	None	5
Untagged	None	11
Untagged	None	10
Untagged	None	6
Untagged	None	8
Untagged	None	9
Untagged	None	0
Untagged	None	8
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	8
Untagged	None	5
Untagged	None	8
Untagged	None	9
Untagged	None	4
Untagged	None	9
Untagged	None	4
Untagged	None	8
Untagged	None	7
Untagged	None	5
Untagged	None	0
Untagged	None	9
Untagged	None	3
Tagged	Silver	41
Untagged	None	9
Untagged	None	5
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	5
Untagged	None	4
Untagged	None	5
Untagged	None	4
Untagged	None	8
Untagged	None	9
Untagged	None	11
Untagged	None	10

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	4
Untagged	None	8
Untagged	None	7
Tagged	White	52
Untagged	None	7
Untagged	None	1
Untagged	None	7
Untagged	None	11
Untagged	None	1
Untagged	None	1
Untagged	None	3
Untagged	None	8
Untagged	None	10
Untagged	None	3
Untagged	None	7
Tagged	Silver	37
Untagged	None	7
Untagged	None	9
Untagged	None	3
Untagged	None	3
Tagged	Silver	39
Untagged	None	5
Untagged	None	4
Untagged	None	2
Untagged	None	5
Untagged	None	11
Untagged	None	10
Untagged	None	10
Untagged	None	7
Untagged	None	5
Untagged	None	6
Untagged	None	3
Untagged	None	11
Tagged	Red	18
Untagged	None	10
Untagged	None	2
Untagged	None	8
Untagged	None	2
Tagged	Green	28
Untagged	None	10
Untagged	None	8
Untagged	None	5
Untagged	None	8
Untagged	None	5
Untagged	None	5

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	0
Untagged	None	10
Untagged	None	6
Untagged	None	2
Untagged	None	4
Untagged	None	5
Untagged	None	9
Tagged	Black	43
Untagged	None	4
Tagged	Silver	36
Untagged	None	11
Untagged	None	9
Untagged	None	9
Untagged	None	6
Untagged	None	7
Untagged	None	5
Untagged	None	0
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	3
Untagged	None	3
Untagged	None	11
Untagged	None	1
Untagged	None	8
Untagged	None	3
Untagged	None	1
Tagged	Orange	48
Untagged	None	3
Untagged	None	7
Untagged	None	3
Untagged	None	5
Untagged	None	4
Untagged	None	3
Untagged	None	10
Untagged	None	6
Untagged	None	11
Tagged	White	54
Untagged	None	10
Untagged	None	3
Tagged	Green	27
Untagged	None	1
Untagged	None	10
Untagged	None	8
Untagged	None	0
Untagged	None	4

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	4
Tagged	Silver	36
Untagged	None	7
Untagged	None	4
Untagged	None	7
Tagged	Green	28
Untagged	None	5
Untagged	None	7
Tagged	Orange	51
Untagged	None	8
Untagged	None	3
Untagged	None	9
Untagged	None	5
Untagged	None	3
Untagged	None	7
Untagged	None	2
Untagged	None	5
Untagged	None	5
Untagged	None	3
Tagged	White	61
Untagged	None	1
Untagged	None	5
Untagged	None	2
Untagged	None	3
Untagged	None	2
Untagged	None	6
Untagged	None	2
Untagged	None	2
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	11
Tagged	Blue	19
Untagged	None	8
Untagged	None	4
Untagged	None	9
Untagged	None	6
Untagged	None	6
Untagged	None	5
Untagged	None	7
Untagged	None	3
Untagged	None	9
Untagged	None	3

Band_Status	Breeding_Cohort	Age_Months
Tagged	Green	23
Tagged	Orange	45
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	8
Untagged	None	2
Untagged	None	6
Untagged	None	2
Untagged	None	7
Untagged	None	3
Untagged	None	3
Untagged	None	8
Untagged	None	11
Untagged	None	5
Untagged	None	5
Untagged	None	5
Untagged	None	6
Untagged	None	1
Untagged	None	6
Untagged	None	7
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	8
Untagged	None	7
Untagged	None	8
Untagged	None	8
Untagged	None	3
Tagged	Black	43
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	11
Untagged	None	2
Untagged	None	8
Untagged	None	5
Untagged	None	5
Tagged	Blue	22
Tagged	Blue	22
Untagged	None	4
Untagged	None	3

Band_Status	Breeding_Cohort	Age_Months
Tagged	Yellow	37
Tagged	Green	25
Untagged	None	3
Untagged	None	6
Untagged	None	3
Untagged	None	5
Untagged	None	11
Untagged	None	8
Untagged	None	3
Untagged	None	7
Untagged	None	0
Untagged	None	6
Untagged	None	4
Untagged	None	9
Untagged	None	5
Untagged	None	5
Untagged	None	3
Untagged	None	4
Untagged	None	5
Untagged	None	10
Untagged	None	11
Untagged	None	8
Untagged	None	7
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	9
Untagged	None	6
Untagged	None	1
Untagged	None	7
Untagged	None	7
Untagged	None	5
Tagged	Black	50
Untagged	None	8
Untagged	None	10
Untagged	None	2
Untagged	None	10
Tagged	Red	15
Untagged	None	10
Untagged	None	8
Untagged	None	5
Untagged	None	7
Untagged	None	6
Untagged	None	7
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	6
Untagged	None	9
Tagged	Red	17
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	4
Untagged	None	6
Untagged	None	4
Tagged	Silver	35
Untagged	None	7
Untagged	None	4
Untagged	None	9
Untagged	None	5
Untagged	None	3
Untagged	None	5
Untagged	None	6
Untagged	None	9
Untagged	None	4
Untagged	None	8
Untagged	None	8
Untagged	None	11
Untagged	None	3
Untagged	None	11
Untagged	None	11
Untagged	None	2
Untagged	None	2
Untagged	None	11
Untagged	None	7
Untagged	None	4
Untagged	None	5
Untagged	None	10
Untagged	None	7
Untagged	None	11
Tagged	Orange	53
Untagged	None	8
Untagged	None	8
Tagged	Red	15
Untagged	None	2
Untagged	None	3
Untagged	None	8
Untagged	None	6
Untagged	None	5
Untagged	None	10
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	11
Untagged	None	4
Tagged	White	60
Untagged	None	9
Untagged	None	4
Untagged	None	11
Untagged	None	3
Untagged	None	6
Untagged	None	9
Tagged	Black	43
Untagged	None	2
Untagged	None	7
Untagged	None	6
Untagged	None	7
Untagged	None	5
Tagged	Green	20
Untagged	None	5
Untagged	None	7
Untagged	None	5
Untagged	None	10
Untagged	None	5
Untagged	None	1
Tagged	White	57
Untagged	None	1
Untagged	None	7
Untagged	None	0
Untagged	None	3
Untagged	None	11
Untagged	None	8
Untagged	None	2
Untagged	None	10
Untagged	None	3
Untagged	None	1
Untagged	None	0
Untagged	None	10
Untagged	None	0
Untagged	None	5
Untagged	None	6
Untagged	None	5
Untagged	None	5
Untagged	None	4
Untagged	None	11
Tagged	Blue	21
Untagged	None	4
Tagged	White	56
Untagged	None	3

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	7
Untagged	None	8
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	6
Untagged	None	11
Untagged	None	6
Untagged	None	6
Untagged	None	8
Untagged	None	5
Untagged	None	8
Untagged	None	5
Untagged	None	1
Tagged	Yellow	28
Untagged	None	2
Untagged	None	1
Untagged	None	9
Untagged	None	8
Untagged	None	2
Untagged	None	5
Untagged	None	6
Untagged	None	4
Untagged	None	7
Untagged	None	6
Untagged	None	4
Untagged	None	4
Untagged	None	3
Untagged	None	4
Untagged	None	4
Untagged	None	8
Untagged	None	2
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	10
Untagged	None	8
Untagged	None	6
Untagged	None	4
Tagged	Red	15
Untagged	None	6
Untagged	None	3

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	4
Untagged	None	2
Untagged	None	7
Untagged	None	10
Untagged	None	4
Untagged	None	5
Untagged	None	6
Untagged	None	4
Untagged	None	3
Untagged	None	5
Untagged	None	2
Untagged	None	10
Tagged	Blue	23
Untagged	None	7
Untagged	None	4
Untagged	None	5
Untagged	None	4
Untagged	None	7
Untagged	None	2
Untagged	None	4
Untagged	None	8
Untagged	None	2
Untagged	None	4
Untagged	None	7
Untagged	None	3
Untagged	None	9
Untagged	None	5
Untagged	None	8
Untagged	None	11
Untagged	None	3
Untagged	None	5
Untagged	None	2
Untagged	None	4
Untagged	None	10
Untagged	None	7
Untagged	None	1
Tagged	White	58
Untagged	None	2
Untagged	None	6
Untagged	None	5
Untagged	None	10
Tagged	Yellow	34
Untagged	None	4
Untagged	None	5
Untagged	None	9
Untagged	None	11

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	6
Untagged	None	4
Untagged	None	8
Tagged	Yellow	35
Untagged	None	8
Untagged	None	11
Untagged	None	11
Untagged	None	8
Untagged	None	11
Untagged	None	9
Untagged	None	10
Untagged	None	7
Untagged	None	6
Untagged	None	10
Untagged	None	8
Untagged	None	10
Untagged	None	4
Untagged	None	11
Untagged	None	8
Untagged	None	7
Untagged	None	5
Untagged	None	8
Untagged	None	8
Untagged	None	5
Untagged	None	3
Untagged	None	2
Untagged	None	1
Untagged	None	2
Untagged	None	2
Untagged	None	11
Untagged	None	6
Untagged	None	4
Untagged	None	11
Untagged	None	6
Untagged	None	5
Untagged	None	9
Untagged	None	3
Untagged	None	9
Tagged	White	58
Untagged	None	4
Untagged	None	5
Untagged	None	1
Untagged	None	9
Untagged	None	11
Untagged	None	11

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	9
Untagged	None	5
Untagged	None	9
Untagged	None	11
Untagged	None	7
Untagged	None	10
Untagged	None	8
Untagged	None	11
Untagged	None	11
Untagged	None	5
Untagged	None	9
Untagged	None	11
Untagged	None	8
Untagged	None	3
Untagged	None	9
Untagged	None	11
Untagged	None	7
Untagged	None	1
Tagged	Black	44
Untagged	None	1
Untagged	None	5
Untagged	None	6
Untagged	None	3
Untagged	None	3
Untagged	None	6
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	5
Untagged	None	6
Tagged	Blue	19
Untagged	None	6
Untagged	None	9
Untagged	None	8
Untagged	None	11
Untagged	None	6
Untagged	None	5
Untagged	None	7
Untagged	None	0
Untagged	None	2
Untagged	None	11
Untagged	None	4
Untagged	None	6
Untagged	None	9
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	2
Untagged	None	9
Untagged	None	9
Untagged	None	8
Untagged	None	6
Untagged	None	11
Untagged	None	4
Untagged	None	6
Tagged	White	59
Untagged	None	7
Untagged	None	5
Untagged	None	8
Untagged	None	9
Untagged	None	5
Untagged	None	7
Tagged	Blue	20
Tagged	Green	23
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	10
Untagged	None	7
Untagged	None	8
Untagged	None	4
Untagged	None	5
Untagged	None	3
Untagged	None	6
Untagged	None	4
Tagged	White	59
Untagged	None	11
Tagged	Red	14
Untagged	None	3
Untagged	None	4
Untagged	None	7
Untagged	None	4
Untagged	None	4
Untagged	None	2
Untagged	None	7
Untagged	None	0
Untagged	None	11
Untagged	None	4
Untagged	None	7
Untagged	None	5
Untagged	None	11

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	10
Untagged	None	3
Untagged	None	8
Untagged	None	4
Untagged	None	11
Untagged	None	5
Untagged	None	8
Untagged	None	7
Untagged	None	6
Untagged	None	6
Untagged	None	5
Untagged	None	4
Untagged	None	11
Untagged	None	3
Untagged	None	3
Untagged	None	8
Untagged	None	1
Untagged	None	3
Untagged	None	4
Untagged	None	5
Untagged	None	11
Tagged	Black	44
Untagged	None	6
Untagged	None	5
Untagged	None	0
Untagged	None	0
Untagged	None	11
Untagged	None	11
Untagged	None	2
Untagged	None	7
Untagged	None	4
Untagged	None	6
Untagged	None	3
Untagged	None	5
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	7
Untagged	None	5
Untagged	None	7
Untagged	None	6
Untagged	None	11
Untagged	None	6
Untagged	None	2
Untagged	None	7

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	3
Untagged	None	6
Untagged	None	8
Untagged	None	9
Untagged	None	5
Untagged	None	8
Untagged	None	5
Tagged	Black	45
Untagged	None	7
Untagged	None	6
Untagged	None	5
Untagged	None	11
Untagged	None	10
Untagged	None	4
Untagged	None	6
Untagged	None	0
Untagged	None	0
Untagged	None	9
Untagged	None	6
Untagged	None	9
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	4
Untagged	None	9
Tagged	Orange	51
Untagged	None	7
Untagged	None	3
Untagged	None	6
Untagged	None	7
Untagged	None	0
Untagged	None	2
Untagged	None	3
Untagged	None	3
Untagged	None	2
Untagged	None	5
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	6
Tagged	Silver	39
Untagged	None	2
Untagged	None	7
Untagged	None	6

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	5
Untagged	None	6
Untagged	None	8
Tagged	White	57
Untagged	None	10
Untagged	None	6
Untagged	None	6
Untagged	None	5
Untagged	None	1
Tagged	Black	44
Untagged	None	9
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	2
Untagged	None	8
Untagged	None	5
Untagged	None	6
Untagged	None	9
Untagged	None	6
Untagged	None	2
Tagged	Black	49
Untagged	None	0
Untagged	None	5
Untagged	None	8
Untagged	None	4
Untagged	None	4
Untagged	None	5
Untagged	None	8
Untagged	None	5
Untagged	None	8
Untagged	None	4
Untagged	None	3
Untagged	None	6
Untagged	None	6
Untagged	None	6
Untagged	None	4
Untagged	None	4
Untagged	None	11
Tagged	Silver	38
Untagged	None	3
Untagged	None	6
Tagged	Orange	55
Untagged	None	2
Untagged	None	0

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	7
Untagged	None	5
Untagged	None	5
Untagged	None	11
Untagged	None	7
Untagged	None	6
Untagged	None	5
Untagged	None	5
Untagged	None	5
Untagged	None	10
Untagged	None	9
Untagged	None	7
Untagged	None	3
Untagged	None	5
Untagged	None	9
Untagged	None	5
Untagged	None	9
Untagged	None	5
Untagged	None	5
Untagged	None	8
Untagged	None	8
Tagged	Silver	38
Untagged	None	11
Untagged	None	9
Untagged	None	7
Untagged	None	10
Untagged	None	11
Untagged	None	4
Untagged	None	0
Untagged	None	1
Untagged	None	9
Untagged	None	2
Untagged	None	10
Untagged	None	0
Untagged	None	10
Untagged	None	8
Untagged	None	11
Untagged	None	9
Untagged	None	10
Untagged	None	8
Untagged	None	10
Untagged	None	6
Untagged	None	3
Untagged	None	9
Untagged	None	9

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	7
Untagged	None	4
Untagged	None	5
Untagged	None	7
Untagged	None	11
Tagged	Blue	16
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	9
Untagged	None	6
Untagged	None	8
Untagged	None	11
Untagged	None	5
Untagged	None	3
Untagged	None	6
Untagged	None	8
Untagged	None	2
Untagged	None	8
Untagged	None	4
Untagged	None	9
Untagged	None	9
Untagged	None	6
Untagged	None	8
Untagged	None	10
Untagged	None	2
Untagged	None	5
Untagged	None	11
Untagged	None	7
Untagged	None	11
Tagged	Orange	49
Untagged	None	8
Untagged	None	9
Untagged	None	3
Untagged	None	8
Tagged	Blue	17
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	10
Untagged	None	10
Untagged	None	8

Band_Status	Breeding_Cohort	Age_Months
Tagged	Blue	28
Untagged	None	7
Untagged	None	3
Untagged	None	4
Untagged	None	9
Untagged	None	6
Untagged	None	5
Untagged	None	3
Tagged	Black	39
Untagged	None	5
Untagged	None	9
Untagged	None	8
Untagged	None	6
Untagged	None	3
Untagged	None	5
Untagged	None	7
Untagged	None	7
Untagged	None	9
Untagged	None	8
Untagged	None	5
Untagged	None	8
Untagged	None	5
Tagged	Blue	20
Tagged	Orange	48
Untagged	None	9
Untagged	None	7
Untagged	None	11
Untagged	None	0
Untagged	None	3
Untagged	None	5
Tagged	Orange	53
Untagged	None	6
Untagged	None	6
Untagged	None	4
Tagged	Black	42
Untagged	None	5
Untagged	None	7
Untagged	None	7
Untagged	None	5
Untagged	None	5
Untagged	None	5
Untagged	None	5
Untagged	None	8
Untagged	None	8
Untagged	None	3
Untagged	None	3

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	5
Untagged	None	4
Untagged	None	4
Untagged	None	3
Untagged	None	7
Untagged	None	5
Untagged	None	7
Untagged	None	5
Untagged	None	6
Untagged	None	7
Untagged	None	6
Untagged	None	5
Untagged	None	6
Untagged	None	11
Untagged	None	7
Untagged	None	8
Untagged	None	5
Untagged	None	3
Untagged	None	3
Untagged	None	3
Tagged	Black	40
Untagged	None	6
Untagged	None	8
Tagged	Blue	20
Untagged	None	4
Untagged	None	4
Untagged	None	6
Untagged	None	5
Tagged	Red	18
Untagged	None	4
Untagged	None	6
Untagged	None	4
Untagged	None	4
Untagged	None	3
Untagged	None	1
Untagged	None	6
Tagged	Green	26
Untagged	None	8
Untagged	None	6
Untagged	None	0
Untagged	None	0
Untagged	None	10
Untagged	None	4
Untagged	None	7
Untagged	None	8
Tagged	Green	23

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	9
Untagged	None	10
Untagged	None	7
Untagged	None	7
Untagged	None	6
Untagged	None	3
Untagged	None	7
Untagged	None	8
Untagged	None	6
Untagged	None	5
Untagged	None	10
Untagged	None	1
Untagged	None	5
Untagged	None	2
Untagged	None	5
Untagged	None	8
Untagged	None	11
Untagged	None	7
Untagged	None	3
Untagged	None	5
Untagged	None	1
Tagged	Blue	26
Untagged	None	8
Untagged	None	6
Untagged	None	4
Untagged	None	8
Untagged	None	6
Untagged	None	7
Untagged	None	7
Untagged	None	6
Untagged	None	5
Untagged	None	8
Untagged	None	7
Untagged	None	6
Untagged	None	2
Untagged	None	11
Tagged	Red	12
Untagged	None	6
Untagged	None	5
Untagged	None	0
Untagged	None	9
Untagged	None	4
Untagged	None	11
Untagged	None	7
Untagged	None	4
Untagged	None	3

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	8
Untagged	None	5
Untagged	None	8
Tagged	Blue	14
Untagged	None	9
Untagged	None	10
Untagged	None	7
Untagged	None	5
Untagged	None	4
Untagged	None	9
Untagged	None	7
Untagged	None	9
Untagged	None	8
Untagged	None	8
Untagged	None	7
Untagged	None	4
Untagged	None	6
Untagged	None	6
Untagged	None	3
Untagged	None	3
Untagged	None	5
Tagged	Orange	55
Untagged	None	6
Untagged	None	5
Untagged	None	4
Untagged	None	7
Untagged	None	2
Untagged	None	5
Untagged	None	6
Untagged	None	3
Untagged	None	3
Untagged	None	9
Untagged	None	11
Untagged	None	0
Untagged	None	5
Untagged	None	10
Untagged	None	8
Untagged	None	4
Untagged	None	6
Untagged	None	2
Untagged	None	1
Untagged	None	5
Untagged	None	8
Untagged	None	2
Untagged	None	3
Untagged	None	8

Band_Status	Breeding_Cohort	Age_Months
Untagged	None	11
Untagged	None	2
Untagged	None	7
Untagged	None	7
Untagged	None	7
Untagged	None	5
Untagged	None	9
Untagged	None	8
Tagged	Silver	42
Untagged	None	5
Untagged	None	4
Untagged	None	5
Tagged	Green	27
Untagged	None	6
Untagged	None	0
Untagged	None	9
Untagged	None	4
Untagged	None	6
Untagged	None	6
Untagged	None	11
Untagged	None	4
Untagged	None	5

9. Replace Missing Values

In lesson 4, you learned about handling missing values. Now, let's practice replacing missing values in a data frame. Recall that when a numeric vector has gaps, you can impute with the mean.

Type the following code in a new code chunk and run.

```
# Before
trial_vec
```

```
## [1]  1 NA NA  1  2 NA NA  3 NA  2  3  3  1 NA NA  2 NA NA  2 NA  1 NA NA NA  1
```

```
trial_vec[is.na(trial_vec)] <- mean(trial_vec, na.rm = TRUE)
```

The <- operator is not just for assigning a value to a variable name. Here the <- operator is used to assign the mean of the non-NA values'

Left side of the assignment: trial_vec[is.na(trial_vec)]

- x[ ] index of a vector: Recall we can use ":" like 1:3

- index value is is.na(trial_vec) making logical vector (TRUE/FALSE) marking which elements are NA.

Right side of the assignment: mean(trial_vec, na.rm = TRUE)

- mean() calculates the mean of the non-NA values in trial_vec

The assignment operator <- takes the value from the right side, places it into the specific positions identified on the left side.

```
# After
trial_vec
```

```
##  [1] 1.000000 1.833333 1.833333 1.000000 2.000000 1.833333 1.833333 3.000000
##  [9] 1.833333 2.000000 3.000000 3.000000 1.000000 1.833333 1.833333 2.000000
## [17] 1.833333 1.833333 2.000000 1.833333 1.000000 1.833333 1.833333 1.833333
## [25] 1.000000
```

R took all the non-missing values, calculated their mean and replaced all the NA values with this decimal mean

10. ⬚ Assignment

Now it's your turn to practice creating and using vector objects. Follow the tasks below to complete part of the **technical skill practice assignment**.

1. Work through each task in order. Replace the ___ placeholder with your code or short written answer.

2. Run each completed line to be sure no errors appear and objects show in the Environment.

3. When finished, save your workspace and submit this R Markdown file (RMD) plus the .RData file.

10.1 Task 0

⬚ Setup: Load the built-in data set mtcars and take a quick look. Identify what the columns contain and meaning of that content.

```r
data("mtcars")   # already in memory but this keeps the workflow explicit
?mtcars          # help file for variable descriptions
View(mtcars)     # spreadsheet view (optional)
```

⬚ Comment: Explain R's basic subsetting template. Hint: It looks like data[rows , columns]

10.2 Task 1

⬚ Manual vs. Automatic

1. Create Manual_Cars: all rows where am == 1 (manual), all columns.

```r
Manual_Cars <- ___
```

2. Use nrow() to record how many manual cars there are (store in n_manual).

```r
n_manual <- ___   # numeric count
```

10.3 Task 2

☐ MPG by Cylinder

Extract mpg for each cylinder group into separate objects. Hint: Repeat the bracket pattern

```r
Four_Cyl_MPG  <- mtcars[mtcars$cyl == 4, "mpg"]
Six_Cyl_MPG   <- ___
Eight_Cyl_MPG <- ___
```

10.4 Task 3

☐ Analyze Fuel Efficiency

1. Compute the mean mpg for each object.

```r
mean_4 <- mean(___)
mean_6 <- mean(___)
mean_8 <- mean(___)
```

2. ☐ Comment: Which cylinder group is most fuel☐ efficient? Answer in one word or number.

Most efficient: ____

10.5 Task 4

☐ Safe vs. Direct Editing

1. Make a safe copy of mtcars called cars_safe.

```r
cars_safe <- ___
```

2. Rename the 'am' column in cars_safe to "Transmission_Type".

```r
colnames(cars_safe)[___] <- ___
```

3. ☐ Comment: Explain *why* working on cars_safe (a copy) is safer than editing mtcars directly.

Answer: ___

10.6 Task 5

☐ Practice which()

Using cars_safe, extract the rows for V☐shaped engines (vs == 0) *and* horsepower (hp) above 150. Use which() for the row indices and keep only mpg, hp, and cyl columns. Name the object hi_power_v.

1. Create row_idx for the condition above.

- cars_safe$vs ? 0

- &

- cars_safe$hp ? 150

- cars_safe[row_idx , c("mpg","hp","cyl")]

```
row_idx    <- ___
```

2. Subset cars_safe with row_idx and columns mpg, hp, cyl. Name object hi_power_v.

```
hi_power_v  <- ___
head(hi_power_v)
```

10.7 Task 6

☐ Insertion Example

Add a new column called "Efficiency_Class" to cars_safe. Label "High" if mpg >= 25, "Low" otherwise.

Hint: use ifelse() and cars_safe$mpg >= 25, "?", "?"

```
cars_safe$Efficiency_Class <- ___
```

11. Save and Upload

1. You will be submitting **both** the R Markdown and the workspace file. The workspace file saves all the objects in your environment that you created in this lesson.

Or you can click the "Save Workspace" button in the Environment pane.

☐ **Always save the R documents before closing.**

2. Find the assignment in this week's module in Canvas and upload **both** the RMD and the workspace file.

12. Today you practiced:

- Reading R's subsetting template x[rows, cols].

- Extracting rows with logical tests and which().

- Selecting columns by index or name.

- Safely overwriting values (insertion) after making a copy.

- Renaming columns and imputing simple missing values.

☐ Great job! Subsetting is the gateway to every data-cleaning task.