

RESEARCH GOALS

Our research study consists of two primary groups, specifically the inhabitants of “**Ironbard**” and “**Providence**”. Our research objective is to establish how per-household demographics, particularly household income and average age, differ between these two islands. The research question focuses on exploring whether household income varies significantly based on household size across the two populations.

RESEARCH QUESTION

Do household income and household size differ significantly between the inhabitants of Ironbard and Providence, and is there an observable relationship between household size and income within each group?

We selected this research topic to understand the interplay between economic and demographic factors between the 2 islands. Specifically, how differences in household structure and income distribution are indicators of cultural, economic, and social differences.

Ideally, this could provide insights into broader socio-economic trends. For example, larger households may suggest cultural norms favoring extended families, while differences in income across household sizes could highlight variations in economic opportunities or living costs.

RESPONSE VARIABLES

| Variable | Type | Justification |
|--------------------------|------------|-----------------------------------------------------------------------------------------------------------|
| Household Income (Gross) | Continuous | Household income is a measurable numeric value. (float). |
| Household Size | Discrete | Household size is the count of people living in the given household, you cannot have half a person. (int) |
| Island | Nominal | Categorical value, no inherit ranking between islands. |
| Residence | Nominal | Categorical value, no inherit ranking between houses. |

METHODOLOGY

10 households per major population at random where selected. 4 Major population centers were selected at random per island. 2 Islands where selected. A computer was used to select the random participants to ensure fairness and avoid bias at each step. This would closely follow **multi-stage sampling** methodology. Duplicates would have been discarded however none occurred.

Data was collected manually and directly from the Islands website. Alexander was responsible for the collection from Ironbard. In turn Cody was responsible for collection of Providence.

23/11/2024 – Collection of the HOFN and HELLULAND Regions, Ironbard.

24/11/2024 – Collection of the VARDÖ and BJURHOLM Regions, Ironbard.

23/11/2024 – Collection of the SHINOBI, READING, KIYOBICO and ARCADIA regions, Providence.

Over study was entirely observational in nature, no direct participation was required of the participants and no participant was directly engaged as part of the study.

DATA

| Name | Age | Occupation | Income (\$) | Residence | Gender | Island |
|-----------------|-----|----------------|-------------|-------------|--------|------------|
| Robin Edwards | 32 | Cabinetmaker | 4943 | Shinobi 1 | male | Providence |
| Lucy Price | 32 | Wine Maker | 4945 | Shinobi 1 | female | Providence |
| Miki Price | 11 | Student | | Shinobi 1 | female | Providence |
| Kevin Price | 10 | Student | | Shinobi 1 | male | Providence |
| Bailey Morris | 59 | Poultry Farmer | 5281 | Shinobi 7 | male | Providence |
| Hallmar Lund | 34 | Carpenter | 4390 | Shinobi 20 | male | Providence |
| Gabrielle Mori | 33 | Tailor | 4391 | Shinobi 20 | female | Providence |
| Laurie Mori | 15 | Student | | Shinobi 20 | female | Providence |
| Jacques Mori | 13 | Student | | Shinobi 20 | female | Providence |
| Maya Sato | 81 | | 256 | Shinobi 23 | male | Providence |
| Johanna Jensen | 51 | Poultry Farmer | 4805 | Shinobi 103 | female | Providence |
| Anika Carlsen | 75 | Book Club | 2566 | Shinobi 126 | female | Providence |
| Emma Carlsen | 56 | Butcher | 5580 | Shinobi 163 | female | Providence |
| Akira Connolly | 59 | Lawyer | 13215 | Shinobi 205 | female | Providence |
| Shane Watanabe | 90 | | 301 | Shinobi 380 | male | Providence |
| Isabelle Eklund | 60 | | 5977 | Shinobi 395 | female | Providence |
| Zachary Ibsen | 59 | | 5942 | Shinobi 395 | male | Providence |
| Lysiane Verdier | 40 | Wheat Farmer | 6898 | Reading 17 | female | Providence |
| Gunnar Carlsen | 39 | Stonemason | 6935 | Reading 17 | male | Providence |
| Stefanie Huber | 28 | Author | 7811 | Reading 39 | female | Providence |
| Haruki Arai | 28 | Engraver | 7816 | Reading 39 | female | Providence |
| Hiroto Arai | 7 | Student | | Reading 39 | male | Providence |

| | | | | | | |
|-------------------------|----|--------------------------------|-------|--------------|--------|------------|
| Jessica Edwards | 34 | Butcher | 4217 | Reading 76 | female | Providence |
| Itsumi Taketa | 88 | | 259 | Reading 173 | female | Providence |
| Tsugamichi Ueda | 84 | | 258 | Reading 173 | male | Providence |
| Maan Mehta | 49 | Hairdresser | 8522 | Reading 305 | male | Providence |
| Anund Jensen | 20 | Coachman | 1781 | Reading 816 | male | Providence |
| Erin Jackson | 33 | Nurse | 3968 | Reading 835 | female | Providence |
| Suhanisa Datta | 33 | Waiter | 3898 | Reading 835 | female | Providence |
| Cariel Blomgren | 24 | Chef | 1627 | Reading 810 | female | Providence |
| Darren Sato | 24 | | 1617 | Reading 810 | male | Providence |
| Leira Blomgren | 5 | | | Reading 810 | female | Providence |
| Kaya Blomgren | 3 | | | Reading 810 | female | Providence |
| Kerstin Blomgren | 1 | | | Reading 810 | female | Providence |
| Britt Blomgren | 1 | | | Reading 810 | female | Providence |
| Tyr Eklund | 23 | Plumber | 4973 | Reading 759 | male | Providence |
| Haruko Okada | 29 | Miller | 3152 | Reading 658 | male | Providence |
| Mariko Okada | 10 | Student | | Reading 658 | male | Providence |
| Kanoko Okada | 8 | Student | | Reading 658 | female | Providence |
| Satoru Okada | 3 | | | Reading 658 | female | Providence |
| Arvid Bager Campbell | 19 | | 64 | Kiyobico 1 | male | Providence |
| Williamson | 39 | Magician | 8082 | Kiyobico 13 | male | Providence |
| Aimon Connolly | 23 | Cleaner | 3310 | Kiyobico 7 | male | Providence |
| Yvette Jackson | 28 | | 2850 | Kiyobico 26 | female | Providence |
| Dr Joelle Coulon | 27 | Doctor | 2926 | Kiyobico 26 | male | Providence |
| Felix Brown | 14 | Student | 403 | Kiyobico 26 | male | Providence |
| Misaki Connolly | 45 | Fisherman | 7344 | Kiyobico 134 | female | Providence |
| Henri Simon | 43 | Wine Maker | 7347 | Kiyobico 134 | male | Providence |
| Liam Connolly | 19 | Cleaner | 2072 | Kiyobico 134 | male | Providence |
| Koro Fukuda | 29 | Librarian | 2700 | Kiyobico 233 | male | Providence |
| Ishana Kumar | 29 | | 2670 | Kiyobico 233 | female | Providence |
| Nira Kumar | 9 | Student | | Kiyobico 233 | female | Providence |
| Chiyako Fukuda | 7 | Student | | Kiyobico 233 | female | Providence |
| Jules Ibsen | 18 | Stonemason | 999 | Kiyobico 460 | male | Providence |
| Melodie Ahmad | 21 | Waiter | 1631 | Kiyobico 534 | female | Providence |
| Ilka Petersen | 32 | Stonemason | 7963 | Kiyobico 483 | female | Providence |
| Rosa Petersen | 13 | Student | | Kiyobico 483 | female | Providence |
| Dieter Petersen | 11 | Student | | Kiyobico 483 | female | Providence |
| Bindi Bahadur | 47 | Historian | 11833 | Kiyobico 422 | female | Providence |
| Noah Morris | 54 | Librarian Elementary School | 7855 | Arcadia 15 | female | Providence |
| Maud Georges | 52 | Teacher | 7859 | Arcadia 15 | female | Providence |
| Chahel Devar | 53 | Stonemason | 7982 | Arcadia 32 | male | Providence |
| Benjamin Morris | 53 | Tailor | 11512 | Arcadia 67 | male | Providence |

| | | | | | | |
|------------------|----|-----------------------------|-------|---------------|--------|------------|
| Zahira Basu | 52 | Technician | 11537 | Arcadia 67 | female | Providence |
| Charles Dupont | 31 | Apple Farmer | 4031 | Arcadia 132 | male | Providence |
| Takao Shimada | 29 | Kitchen Hand | 4021 | Arcadia 132 | male | Providence |
| Lee Wilson | 56 | Potato Farmer | 5503 | Arcadia 359 | male | Providence |
| Rosalie Connolly | 56 | Chef | 5508 | Arcadia 359 | female | Providence |
| Manami Jackson | 44 | Acupuncturist Literature | 9207 | Arcadia 489 | female | Providence |
| Dr Marc Langlois | 43 | Professor | 9254 | Arcadia 489 | male | Providence |
| Bernard Langlois | 18 | University student | 1384 | Arcadia 489 | male | Providence |
| Michael Sorensen | 32 | Plumber | 7138 | Arcadia 623 | male | Providence |
| Paige Connolly | 31 | Plasterer | 7137 | Arcadia 623 | male | Providence |
| Olson Sorensen | 8 | Student | | Arcadia 623 | male | Providence |
| Joaquim Bertin | 53 | Dairy Farmer | 5541 | Arcadia 600 | male | Providence |
| Mariko Endo | 51 | Potato Farmer | 5549 | Arcadia 600 | male | Providence |
| Cariel Lund | 57 | Shearer High School | 6196 | Arcadia 744 | female | Providence |
| Hakan Lund | 56 | Teacher | 6207 | Arcadia 744 | male | Providence |
| Emilie Sorensen | 20 | Cleaner | 1707 | Arcadia 811 | female | Providence |
| Louis Sorensen | 2 | | | Arcadia 811 | male | Providence |
| Ursula Eklund | 33 | | 4,014 | Helluland 393 | Female | Ironbard |
| Hiro Price | 29 | | 4,042 | Helluland 393 | Male | Ironbard |
| Olson Eklund | 8 | | | Helluland 393 | Male | Ironbard |
| | | 11/309Wheat | | | | |
| Ajay Agarwal | 66 | Farmer | 885 | Helluland 316 | Male | Ironbard |
| Megan Morris | 33 | | 2,308 | Helluland 40 | Female | Ironbard |
| Anand Achari | 31 | | 2,328 | Helluland 40 | Male | Ironbard |
| Tyler Morris | 12 | | | Helluland 40 | Male | Ironbard |
| Kieran Morris | 11 | | | Helluland 40 | Male | Ironbard |
| Francesca Morris | 8 | | | Helluland 40 | Female | Ironbard |
| Tyr Jensen | 19 | | 2,140 | Helluland 355 | Male | Ironbard |
| Naoto Morris | 67 | 15/321Pig Farmer | 1,225 | Helluland 45 | Male | Ironbard |
| Judith Bergmann | 67 | | 1,214 | Helluland 45 | Female | Ironbard |
| Chaman Lingutla | 24 | | 7,523 | Helluland 415 | Male | Ironbard |
| | | 02/302Sheep | | | | |
| Saeed Bose | 88 | Farmer | 502 | Helluland 270 | Male | Ironbard |
| Yves Georges | 27 | | 4,242 | Helluland 275 | Male | Ironbard |
| Shauna Brown | 74 | | 446 | Helluland 119 | Female | Ironbard |
| Joshua Suzuki | 74 | | 443 | Helluland 119 | Male | Ironbard |
| Gen Kimura | 33 | | 6,017 | Bjurholm 33 | Male | Ironbard |
| | | 04/347Poultry | | | | |
| Denis Suzuki | 32 | Farmer | 6,031 | Bjurholm 33 | Male | Ironbard |
| | | 16/321Poultry | | | | |
| Jamie Brown | 59 | Farmer | 6,605 | Bjurholm 181 | Male | Ironbard |
| Hanna Solberg | 58 | | 6,574 | Bjurholm 181 | Female | Ironbard |

| | | | | | | |
|-------------------|----|------------------|-------|--------------|--------|----------|
| | | 11/299Poultry | | | | |
| Saika Sato | 76 | Farmer | 269 | Bjurholm 28 | Female | Ironbard |
| Alister Mackay | 75 | | 262 | Bjurholm 28 | Male | Ironbard |
| Felix Blomgren | 55 | Oat Farmer | 4,136 | Bjurholm 13 | Male | Ironbard |
| Pernille Sorensen | 54 | | 4,140 | Bjurholm 13 | Female | Ironbard |
| Norbert Lutz | 87 | | 2,632 | Bjurholm 80 | Male | Ironbard |
| Erin Morris | 62 | | 2,653 | Bjurholm 80 | Female | Ironbard |
| | | 08/328Cotton | | | | |
| Emma Bager | 58 | Farmer | 4,681 | Bjurholm 390 | Female | Ironbard |
| Juhani Thorn | 57 | 28/318Pig Farmer | 4,520 | Bjurholm 390 | Male | Ironbard |
| Dane Sorensen | 50 | Oat Farmer | 4,341 | Bjurholm 78 | Male | Ironbard |
| Suhanisa | | | | | | |
| Varadhan | 49 | 20/346Oat Farmer | 4,322 | Bjurholm 78 | Female | Ironbard |
| | | 22/325Dairy | | | | |
| Erik Blomgren | 56 | Farmer | 8,001 | Bjurholm 166 | Male | Ironbard |
| Friederike | | | | | | |
| Bergmann | 55 | 16/330Oat Farmer | 8,028 | Bjurholm 166 | Female | Ironbard |
| Sarah Yamada | 28 | Pig Farmer | 4,899 | Bjurholm 155 | Female | Ironbard |
| Ryan Yamada | 5 | | | Bjurholm 155 | Male | Ironbard |
| Marcus Yamada | 5 | | | Bjurholm 155 | Male | Ironbard |
| Viggo Jensen | 26 | Oat Farmer | 3,587 | Bjurholm 163 | Male | Ironbard |
| | | 28/337Sheep | | | | |
| Matthew Edwards | 49 | Farmer | 8,899 | Vardo 148 | Male | Ironbard |
| | | 15/333Dairy | | | | |
| Miriam Kunz | 48 | Farmer | 8,958 | Vardo 148 | Female | Ironbard |
| Zoe Hardy | 28 | Pig Farmer | 5,301 | Vardo 540 | Female | Ironbard |
| Gemma Wilson | 38 | | 2,373 | Vardo 11 | Female | Ironbard |
| Lukas Thorn | 38 | | 2,358 | Vardo 11 | Male | Ironbard |
| Kana Wilson | 18 | | | Vardo 11 | Female | Ironbard |
| Hunter Wilson | 17 | | | Vardo 11 | Male | Ironbard |
| Daniel Watanabe | 18 | Oat Farmer | 1,304 | Vardo 474 | Male | Ironbard |
| Nicole Walther | 84 | | 500 | Vardo 415 | Female | Ironbard |
| Torvald Solberg | 20 | | 602 | Vardo 263 | Male | Ironbard |
| Nils Eklund | 39 | | 4,050 | Vardo 589 | Male | Ironbard |
| Marie Bager | 38 | 15/342Oat Farmer | 4,014 | Vardo 589 | Female | Ironbard |
| Kayleigh Morris | 21 | | 1,731 | Vardo 589 | Female | Ironbard |
| Helga Bager | 18 | | 612 | Vardo 589 | Female | Ironbard |
| Gunnar Eklund | 3 | | | Vardo 589 | Male | Ironbard |
| Lucas Morris | 2 | | | Vardo 589 | Male | Ironbard |
| Mirai Datta | 45 | 11/335Pig Farmer | 7,996 | Vardo 194 | Female | Ironbard |
| | | 17/331Dairy | | | | |
| Thurston Eklund | 44 | Farmer | 8,007 | Vardo 194 | Male | Ironbard |
| Amara Datta | 18 | | 592 | Vardo 194 | Female | Ironbard |
| Gunnar Sorensen | 30 | | 1,904 | Vardo 491 | Male | Ironbard |
| Lea Lund | 28 | | 1,867 | Vardo 491 | Female | Ironbard |

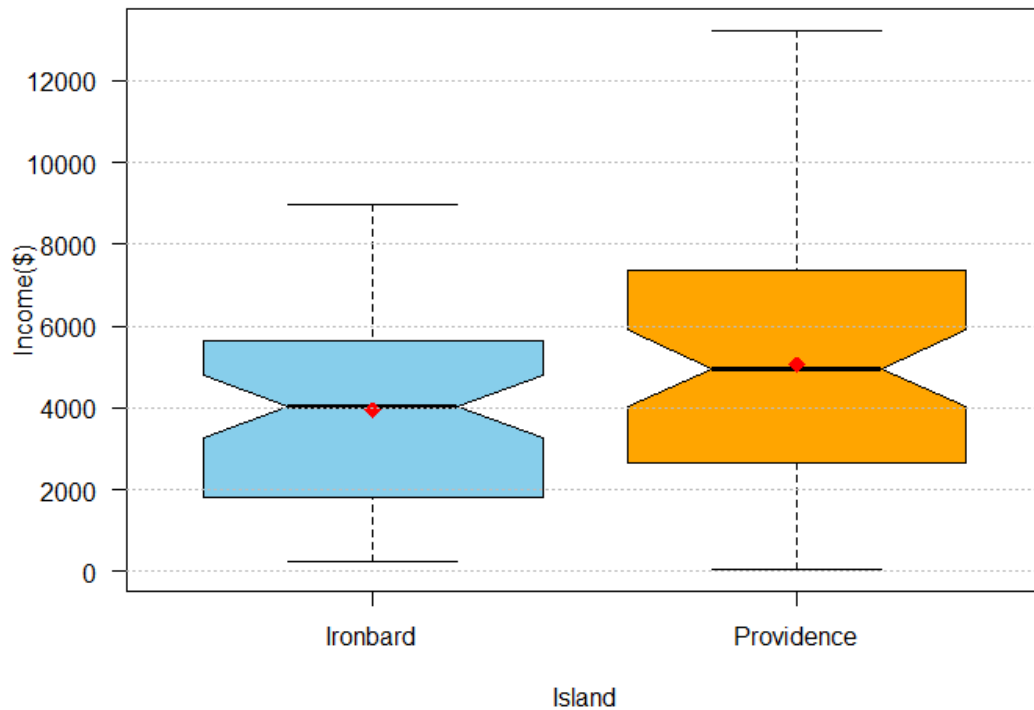
| | | | | | | |
|------------------|----|-------------------------|-------|-----------|--------|----------|
| Tyr Lund | 8 | | | Vardo 491 | Male | Ironbard |
| Cariel Sorensen | 6 | | | Vardo 491 | Female | Ironbard |
| Signe Carlsen | 56 | 15/322Poultry Farmer | 4,361 | Vardo 24 | Female | Ironbard |
| David Schumann | 32 | 28/346Poultry Farmer | 3,979 | Hofn 626 | Male | Ironbard |
| Hallmar Ibsen | 33 | 15/344Wheat Farmer | 8,067 | Hofn 852 | Male | Ironbard |
| Kari Ibsen | 32 | | 8,093 | Hofn 852 | Female | Ironbard |
| Ingrid Ibsen | 14 | | | Hofn 852 | Female | Ironbard |
| Kristjana Ibsen | 12 | | | Hofn 852 | Female | Ironbard |
| David Ibsen | 11 | | | Hofn 852 | Male | Ironbard |
| Galen Erickson | 35 | 15/340Pig Farmer | 4,858 | Hofn 772 | Female | Ironbard |
| Tineka Lund | 33 | | 4,864 | Hofn 772 | Female | Ironbard |
| Lars Eklund | 35 | Poultry Farmer | 4,367 | Hofn 657 | Male | Ironbard |
| Alexander Binder | 34 | | 4,336 | Hofn 657 | Male | Ironbard |
| Ren Regan | 24 | | 3,670 | Hofn 891 | Male | Ironbard |
| Vilina Lingutla | 22 | | 3,672 | Hofn 891 | Female | Ironbard |
| Ellen Regan | 2 | | | Hofn 891 | Female | Ironbard |
| Kazuya Regan | 0 | | | Hofn 891 | Male | Ironbard |
| Lucie Pillai | 24 | 16/354Sheep Farmer | 948 | Hofn 842 | Female | Ironbard |
| Xavier Pillai | 5 | | | Hofn 842 | Male | Ironbard |
| Ketan Bahadur | 66 | | 7,910 | Hofn 359 | Male | Ironbard |
| Tyr Olsen | 55 | 16/328Poultry Farmer | 8,044 | Hofn 114 | Male | Ironbard |
| Sabrina Guenther | 53 | 15/325Dairy Farmer | 8,059 | Hofn 114 | Female | Ironbard |
| Justin Murphy | 22 | | 2,104 | Hofn 145 | Male | Ironbard |
| Tatsumi Shibata | 72 | | 1,137 | Hofn 153 | Male | Ironbard |

END OF DATA

Income distribution between Providence and Ironbark

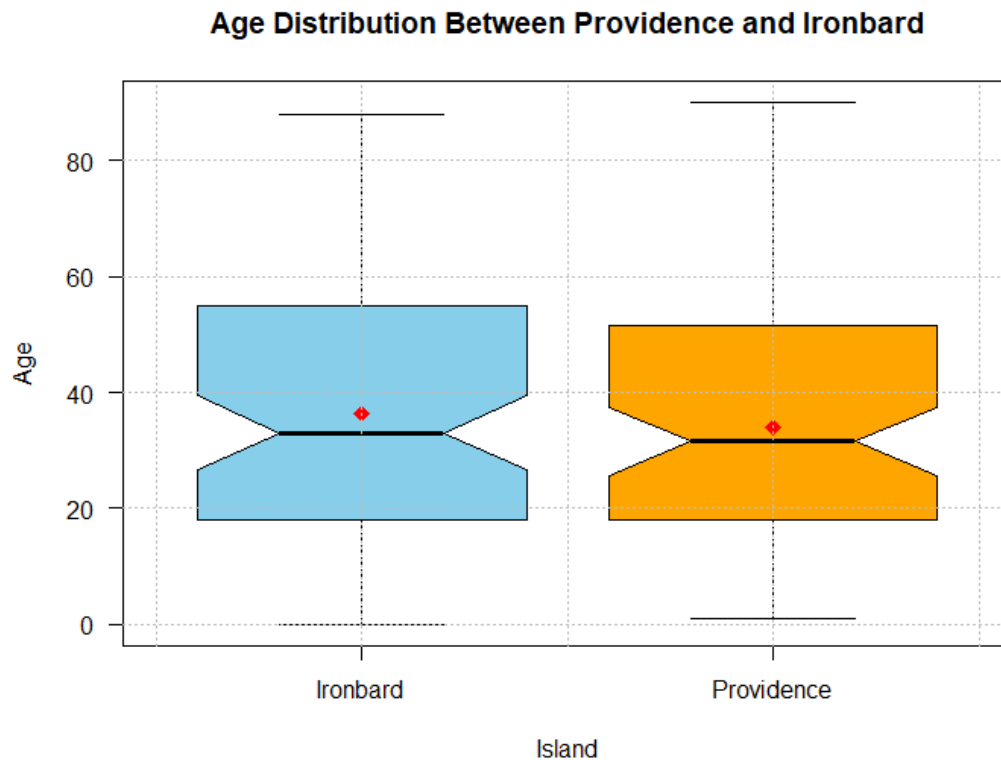
The boxplot shows the income distributions for both islands, after analyzing the boxplot, we can see that the Median income for Ironbark is lower than that of Providence. The mean incomes for the two islands further emphasize this, with Ironbark having a mean income of \$3946 and Providence having a higher mean income of \$5059. Ironbark shows slightly less income variability compared to Providence as its interquartile range is narrower. Providence has the higher maximum incomes, evident from the extended range of the data. Both Islands have no visible outliers in their income data.

Income Distribution Between Providence and Ironbark



Age Distribution Between Providence and Ironbark

The boxplot shows the age distributions for both islands. The median age for both Ironbark and Providence appears similar, located around the 40-year mark. However, the mean ages show a slight difference, with Ironbark having a mean age of 36.4 and Providence having a slightly lower mean age of 33.9. Both islands exhibit a similar range of ages with no significant outliers. These observations suggest that the overall age distributions between the two islands are comparable, with only minor differences in central tendency.



BOXPLOT CODE SNIPPET

```
1. # Attach the dataset to access variables directly
2. attach(combinedIslandData)
3.
4. # Boxplot for age distribution comparison between islands
5. boxplot(Age ~ Island,                # Age grouped by Island
6.         data = combinedIslandData,  # Specify dataset
7.         main = "Age Distribution Between Providence and Ironbard", # Title of the plot
8.         xlab = "Island",            # X-axis label
9.         ylab = "Age",               # Y-axis label
10.        col = c("skyblue", "orange"), # Colors for boxplots
11.        border = "black",           # Border color
12.        notch = TRUE,              # Add notches for median comparison
13.        las = 1)                   # Rotate Y-axis labels for readability
14. grid(nx = NA, ny = NULL, col = "gray", lty = "dotted") # Add dotted grid lines
15.
16. # Add mean points to the boxplot
17. means <- tapply(combinedIslandData$Age, combinedIslandData$Island, mean, na.rm = TRUE) #
Calculate mean age for each island
18. points(1:length(means), means,      # Add points for the means
19.        col = "red", pch = 18, cex = 1.5) # Red diamonds for mean values
20.
21. # Add another set of grid lines for better visualization
22. grid(nx = NULL, ny = NULL, col = "gray", lty = "dotted")
23.
24. # Boxplot for income distribution comparison between islands
25. boxplot(Income ~ Island,            # Income grouped by Island
26.         data = combinedIslandData,  # Specify dataset
27.         main = "Income Distribution Between Providence and Ironbard", # Title of the plot
28.         xlab = "Island",            # X-axis label
29.         ylab = "Income($)",         # Y-axis label
30.         col = c("skyblue", "orange"), # Colors for boxplots
31.         border = "black",           # Border color
32.         notch = TRUE,              # Add notches for median comparison
33.         las = 1)                   # Rotate Y-axis labels for readability
34.
35. # Add mean points to the income boxplot
36. means <- tapply(combinedIslandData$Income, combinedIslandData$Island, mean, na.rm = TRUE) #
Calculate mean income, ignoring NA
37. points(1:length(means), means,      # Add points for the means
38.        col = "red", pch = 18, cex = 1.5) # Red diamonds for mean values
39.
40. # Add another set of grid lines for better visualization
41. grid(nx = NA, ny = NULL, col = "gray", lty = "dotted")
42.
43. # Detach the dataset to clean up the environment
44. detach(combinedIslandData)
45. detach()
46.
```