

# INTRODUCTION TO STATISTICS

## PROBLEM SET 5

S520

1. Suppose that  $X$  is a continuous random variable with probability function.

$$f(x) = \begin{cases} 0 & x < 0 \\ x & x \in (0, 1) \\ (3-x)/4 & x \in (1, 3) \\ 0 & x > 3 \end{cases}.$$

- (a) Compute  $q_2(X)$ , the population median.

Q1. given,  $X$  is a continuous random variable with probability function

$$f(x) = \begin{cases} 0 & x < 0 \\ x & x \in (0, 1) \\ (3-x)/4 & x \in (1, 3) \\ 0 & x > 3 \end{cases}$$

(a)  $q_2(X)$ , population median.

median  $\rightarrow$  value of  $x$  such that CDF of  $x = 0.5$ .  
[ $\because$  median is the 50th percentile]

For  $x = 0$

$$F(x) = \int_0^x 0 \cdot dx = 0$$

For  $0 < x \leq 1$

$$F(x) = \int_0^x t \cdot dt \Rightarrow \frac{1}{2} x^2$$

For  $1 < x \leq 3$

$$F(x) = \int_0^1 t \cdot dt + \int_1^x \frac{(3-t)}{4} dt = \frac{1}{2} + \left[ \frac{3}{4}(x-1) - \frac{1}{4}(x-1)^2 \right]$$

for  $x > 3$   
 $F(x) = 1$  [∵ maximum possible value]

$q_2(x) \rightarrow ?$

$$F(q_2) = 0.5$$

solving for  $q_2$

for  $0 < q_2 \leq 1$

$$\frac{1}{2} (q_2)^2 = 0.5$$

$$q_2^2 = 1$$

$$q_2 = \pm 1$$

we know that  $q_2$  must be in  $(0,1)$  interval

$$\therefore q_2 = 1$$

(b) Which is greater,  $q_2(X)$  or  $E(X)$ ? Explain your reasoning.

(b)  $q_2(x)$  or  $E(x)$ , which is greater?

we know  $q_2(x) = 1$

$E(x) = ?$

$$E(x) = \int_0^4 x \cdot f(x) dx$$

$$\Rightarrow \int_0^1 x \cdot f(x) dx + \int_1^3 x \cdot f(x) dx$$

$$\Rightarrow \int_0^1 x^2 dx + \int_1^3 \frac{3x - x^2}{4} dx$$

$$\Rightarrow \left[ \frac{x^3}{3} \right]_0^1 + \frac{3}{4} \left[ \frac{x^2}{2} \right]_1^3 - \frac{1}{4} \left[ \frac{x^3}{3} \right]_1^3$$

$$\Rightarrow \left[ \frac{1^3 - 0^3}{3} \right] + \frac{3}{4} \left[ \frac{9-1}{2} \right] - \frac{1}{4} \left[ \frac{27-1}{3} \right]$$

$$\Rightarrow \frac{1}{3} + \frac{3}{4} \left[ \frac{8}{2} \right] - \frac{1}{4} \left[ \frac{26}{3} \right]$$

$$\Rightarrow \frac{1}{3} + \frac{24}{8} - \frac{26}{12} = \frac{7}{6}$$

$$\Rightarrow E(x) = 1.17$$

Since  $E(x) = 1.17$  and  $q_2(x) = 1$ ,

$$\boxed{E(x) > q_2(x)}$$

(c) Compute  $P(0.5 < X < 1.5)$ .

(i) compute  $P(0.5 < X < 1.5)$

$$P(0.5 < X < 1.5) = P(X \leq 1.5) - P(X \leq 0.5)$$

$$P(X \leq 1.5) = \int_{-\infty}^{1.5} f(x) dx$$

$$\Rightarrow \int_{-\infty}^0 f(x) dx + \int_0^1 f(x) dx + \int_1^{1.5} f(x) dx$$

$$\Rightarrow 0 + \int_0^1 x dx + \int_1^{1.5} \frac{3}{4} dx - \int_1^{1.5} \frac{x}{4} dx$$

$$\Rightarrow \left[ \frac{x^2}{2} \right]_0^1 + \frac{3}{4} [x]_1^{1.5} - \frac{1}{4} \left[ \frac{x^2}{2} \right]_1^{1.5}$$

$$\Rightarrow \frac{1}{2} + \frac{3}{4} (1.5 - 1) - \frac{1}{4} \times \frac{1}{2} [(1.5)^2 - (1)^2]$$

$$\Rightarrow 0.5 + 0.375 - 0.156 = 0.719$$

$$P(X \leq 1.5) = 0.719$$

$$P(X \leq 0.5) = \int_{-\infty}^{0.5} f(x) dx$$

$$\Rightarrow \int_{-\infty}^0 f(x) dx + \int_0^{0.5} f(x) dx$$

$$0 + \int_0^{0.5} x dx = \left[ \frac{x^2}{2} \right]_0^{0.5} = 0.125$$

$$P(X \leq 0.5) = 0.125$$

$$P(0.5 < X \leq 1.5) = 0.719 - 0.125$$

$$= 0.594$$

(d) Compute  $\text{iqr}(X)$ , the population interquartile range.

(d)  $\text{iqr}(X)$ , population interquartile range.  
 the interquartile range is between the 75th ( $Q_3$ ) and 25th ( $Q_1$ )  
 $F(Q_3) = 0.75$ ;  $F(Q_1) = 0.25$   
 from the CDF, we know  

$$\frac{-Q_3^2 + 6Q_3 - 1}{8} = 0.75$$
  

$$\Rightarrow Q_3^2 - 6Q_3 + 7 = 0$$
  
 quadratic formula:  $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{6 \pm \sqrt{36 - (4 \times 1 \times 7)}}{2}$   

$$\Rightarrow \frac{6 \pm \sqrt{8}}{2} \Rightarrow Q_3 = \frac{6 + 2.82}{2}, \frac{6 - 2.82}{2}$$
  

$$Q_3 = 4.41; 1.59$$
  
 with the known boundaries, we know  $Q_3 = 1.59$   
 $F(Q_1) = 0.25$   

$$\frac{Q_1^2}{2} = 0.25 \Rightarrow Q_1 = 0.7$$
  
 interquartile range =  $Q_3 - Q_1 \Rightarrow 1.59 - 0.7$   

$$= 0.878$$

2. The heights of adult women follow an approximately normal distribution with mean 63.8 inches and SD 2.9 inches.

(a) What percentage of adult women are taller than 65.5 inches?

```
> mean_height <- 63.8
> sd_height <- 2.9
>
> # Height you want to find the probability for
> height <- 65.5
>
> # Calculate the Z-score
> z_score <- (height - mean_height) / sd_height
> z_score
[1] 0.5862069
```

Q2. heights of adult women:  
 normal distribution with mean = 63.8 inches  
 standard deviation = 2.9 inches

(a) percentage of adult women taller than 65.5 inches?  
 $X \sim \text{Normal}$   

$$P(X > 65.5) = P\left(Z > \frac{65.5 - 63.8}{2.9}\right)$$
  

$$\Rightarrow 1 - P(Z < 0.586)$$
  

$$\Rightarrow 1 - 0.72106$$
  

$$\Rightarrow 0.2789 \text{ which is } 27.89\%$$
  
 percentage of women taller than 65.5 inches = 27.89%.

(b) What is the interquartile range of adult women's heights?

```
> z_score <- qnorm(0.25)
> z_score
[1] -0.6744898
> z_score <- qnorm(0.75)
> z_score
[1] 0.6744898
```

(b) Interquartile range of adult women's height.

$$P(X < Q_1) = 0.25$$

$$\frac{Q_1 - 63.8}{2.9} = -0.675$$

$$Q_1 = 61.8425$$

$$P(X < Q_3) = 0.75$$

$$\frac{Q_3 - 63.8}{2.9} = 0.675$$

$$Q_3 = 65.7575$$

$$IQR = Q_3 - Q_1 = 65.7575 - 61.8425 = 3.915$$

(c) Complete the following, rounding to the nearest 0.1 of an inch: "The shortest 2.5% of women are shorter than —, while the tallest 2.5% of women are taller than —."

```
> z_score
[1] -1.959964
> z_score <- qnorm(0.975)
> z_score
[1] 1.959964
```

(c) nearest 0.1 of an inch.

The shortest 2.5% of women are shorter than — while the tallest 2.5% of women are taller than —

$$P(X < C) = 0.025$$

$$\frac{C - 63.8}{2.9} = -1.96$$

$$C = 58.116$$

∴ shortest 2.5% of women are shorter than 58.116

$$P(X < C) = 0.975$$

$$\frac{C - 63.8}{2.9} = 1.96$$

$$C = 69.484$$

∴ tallest 2.5% of women are taller than 69.484

3. (From the Fall 2014 takehome.) Let  $X$  be a standard normal random variable. Let  $Y = X^2$ .

(a) Find  $P(Y > 1)$ .

```
> # Number of random samples to generate
> num_samples <- 100000
>
> # Generate random samples from a standard normal distribution
> x <- rnorm(num_samples)
>
> # Calculate Y = X^2
> y <- x^2
>
> # Calculate the proportion of samples where Y > 1
> probability <- sum(y > 1) / num_samples
>
> cat("P(Y > 1) =", probability, "\n")
P(Y > 1) = 0.31865
```

(b) Find the 0.9-quantile of  $Y$ .

|    |                                       |
|----|---------------------------------------|
| Q3 | 0.90 quantile of $Y$ is $y$ such that |
|    | $P(Y < y) = 0.90$                     |
|    | $P(X^2 < y) = 0.90$                   |
|    | $P(-\sqrt{y} < X < \sqrt{y}) = 0.90$  |
|    | $2P(0 < X < \sqrt{y}) = 0.90$         |
|    | $P(0 < X < \sqrt{y}) = 0.45$          |
|    | $P(X < \sqrt{y}) - P(X < 0) = 0.45$   |
|    | $P(X < \sqrt{y}) - 0.5 = 0.45$        |
|    | $P(X < \sqrt{y}) = 0.95$              |

```
> y=(qnorm(0.95))^2
> y
[1] 2.705543
```

4. Let  $X$  be a continuous random variable with PDF  
 $0.3 \ 0 \leq x < 1 \ f(x) = 0.7 \ 1 \leq x < 2$   
 $0$  otherwise

(a) Find the constant value  $a$  that minimizes  $E|X - a|$ .

Q(4)  $X \rightarrow$  continuous random variable with PDF

$$f(x) = \begin{cases} 0.3 & 0 \leq x < 1 \\ 0.7 & 1 \leq x < 2 \\ 0 & \text{otherwise} \end{cases}$$

(a) constant value  $a$  that minimizes  $E|X - a|$ .  
 The constant value ' $a$ ' that minimizes  $E|X - a|$  is the median. Hence we find  $y$  for  $F(y) = 0.5$   
 $F(y)$  is the CDF

For  $-\infty \leq y < 0$

$$F(y) = 0$$

For  $0 \leq y < 1$

$$F(y) = \int_{-\infty}^y f(x) dx = \int_{-\infty}^0 f(x) dx + \int_0^y f(x) dx$$

$$\Rightarrow 0 + \int_0^y 0.3 dx$$

$$F(0 \leq y < 1) = 0.3y$$

For  $1 \leq y < 2$

$$F(y) = \int_{-\infty}^y f(x) dx = \int_{-\infty}^0 f(x) dx + \int_0^1 f(x) dx + \int_1^y f(x) dx$$

$$\Rightarrow 0 + [0.3y]_0^1 + [0.7]_1^y$$

$$\Rightarrow 0.3 + 0.7y - 0.7$$

$$f(1 \leq y < 2) = 0.7y - 0.4$$

$$\text{for } y \geq 2, F(y) = \int_{-\infty}^0 f(x) dx + \int_0^1 f(x) dx + \int_1^2 f(x) dx + \int_2^y f(x) dx$$

$$\Rightarrow 0 + 0.3 [x]_0^1 + 0.7 [x]_1^2 + 0$$

$$\Rightarrow 0.3 + 0.7(2-1)$$

$$F(y \geq 2) = 1$$

CDF:

$$F(y) = \begin{cases} 0 & -\infty \leq y < 0 \\ 0.3y & 0 \leq y < 1 \\ 0.7y - 0.4 & 1 \leq y < 2 \\ 1 & y \geq 2 \end{cases}$$

$$\text{if } F(y) = 0.5$$

$$0.7y - 0.4 = 0.5$$

$$0.7y = 0.9$$

$$y = \frac{0.9}{0.7}$$

$$y = 1.285 \quad [\because 1 \leq y < 2]$$

$$\therefore a = 1.285$$

The required constant value of  $a$  is 1.285  
that minimizes  $E|x-a|$ .



(b) Find the constant value  $b$  that minimizes  $E[(X - b)^2]$ .

(b) constant value of  $b$  that minimizes  $E[(X-b)^2]$ .  
 The constant value that minimizes is called the Expected value  $E(X)$ .

$$E(X) = \int_{-\infty}^{\infty} x f(x) dx$$

$$E(X) = \int_{-\infty}^0 x f(x) dx + \int_0^1 x f(x) dx + \int_1^2 x f(x) dx + \int_2^{\infty} x f(x) dx$$

$$\Rightarrow 0 + 0.3 \left[ \frac{x^2}{2} \right]_0^1 + 0.7 \left[ \frac{x^2}{2} \right]_1^2 + 0$$

$$\Rightarrow 0 + 0.15 + 1.05$$

$$= 1.2$$

$$E(X) = 1.2$$

constant value ' $b$ ' that minimizes  $E[(X-b)^2]$  is 1.2

5. The file IUSalaries2023.csv contains the salaries of IU Bloomington academic faculty for the 2023–24 academic year (this is publicly available information.) Read this data into R, e.g. by using the function `read.csv()`.  
 Dr. Luen's salary is \$81,902. What is the percentile rank of his salary among IUB academic faculty? Remember to include your code.

```
> getwd()
[1] "/Users/monishapatro/Documents/Intro to Stats/STAT R520/STAT560"
>
> IUSalaries <- read.csv("IUSalaries2023.csv", header = TRUE, sep = ",")
> IUSalaries
```

| COA | Org | Funding.Org | Name                                     | Plan | Grade | Post | Class                    | Pos.Nbr | Dept.ID |
|-----|-----|-------------|--|------|-------|------|--------------------------|---------|---------|
| 1   | BL  | MSCI        | IUSM - BLOOMINGTON                       | AC1  | FVX   | FV8  |                          | 53730   | IN-MSCI |
| 2   | BL  | INFI        | DEPARTMENT OF INFORMATICS                | AC1  | RSP   | RSP  |                          | 48823   | BL-INFI |
| 3   | BL  | CGB         | CGB SEQUENCING FACILITY                  | AC1  | RSS   | RSS  |                          | 28414   | BL-CGBI |
| 4   | BL  | MATH        | MATHEMATICS                              | AC1  | FVX   |      |                          | 745     | BL-MATH |
| 5   | BL  | EBIO        | EPIDEMIOLOGY AND BIostatISTICS           | AC1  | RSS   | RSS  |                          | 9991    | BL-EBIO |
| 6   | BL  | PL          | PHILOSOPHY                               | AC1  | FTX   | AAM  |                          | 13396   | BL-PL   |
| 7   | BL  | INFI        | DEPARTMENT OF INFORMATICS                | AC1  | FTX   | FT1  | PR - Professor           | 53583   | BL-INFI |
| 8   | BL  | SOAD        | ESKENAZI SCHOOL OF ART ARCH + DESIGN     | AC1  | FTX   | FT1  | PR - Professor           | 54488   | BL-SOAD |
| 9   | BL  | SOCW        | SCHOOL OF SOCIAL WORK                    | AC1  | FVX   | FV5  | TL - Lecturer            | 12276   | IN-SOCW |
| 10  | BL  | MUTH        | MUSIC THEORY                             | AC1  | FTX   | FT2  | PC - Associate Professor | 5962    | BL-MUS  |
| 11  | BL  | ENG         | ENGLISH                                  | AC1  | FTX   | AAL  |                          | 5048    | BL-ENG  |
| 12  | BL  | PL          | PHILOSOPHY                               | AC1  | FTX   | FT3  | PT - Assistant Professor | 5453    | BL-PL   |
| 13  | BL  | PSY         | PSYCHOLOGICAL & BRAIN SCIENCES           | AC1  | FVX   | FV8  |                          | 29072   | BL-PSY  |
| 14  | BL  | CIMS        | CINEMA & MEDIA STUDIES                   | AC1  | FTX   | FT2  | PC - Associate Professor | 42519   | BL-CIMS |
| 15  | BL  | SPEA        | THE O'NEILL SCHOOL - BL SPEA             | AC1  | FCX   | FC1  | PR - Professor           | 8171    | BL-SPEA |
| 16  | BL  | NELC        | MIDDLE EASTERN LANGUAGES AND CULTURE     | AC1  | FTX   | FT1  | PR - Professor           | 28698   | BL-NELC |
| 17  | BL  | MATH        | MATHEMATICS                              | AC1  | FLX   | FL5  | TL - Lecturer            | 26799   | BL-MATH |
| 18  | BL  | CEDP        | COUNSELING & EDUCATIONAL PSY             | AC1  | FTX   | FT3  | PT - Assistant Professor | 5689    | BL-EDUC |
| 19  | BL  | APHS        | APPLIED HEALTH SCIENCE                   | AC1  | FTX   | FT2  | PC - Associate Professor | 4698    | BL-APHS |
| 20  | BL  | APHS        | APPLIED HEALTH SCIENCE                   | AC1  | FTX   | FT3  | PT - Assistant Professor | 4698    | BL-APHS |
| 21  | BL  | LAWL        | LAW LIBRARY                              | AC1  | LTX   | LT2  | LC - Associate Librarian | 18019   | BL-LAWL |
| 22  | BL  | BI          | BIOLOGY                                  | AC1  | RSS   | RSS  |                          | 878     | BL-BI   |
| 23  | BL  | INFI        | DEPARTMENT OF INFORMATICS                | AC1  | FTX   | FT1  | PR - Professor           | 26761   | BL-INFI |
| 24  | BL  | BEPP        | DEPT OF ECONOMICS & PUBLIC POLICY        | AC1  | FVX   | FV3  | PT - Assistant Professor | 54605   | BL-BUS  |
| 25  | BL  | EALC        | EAST ASIAN LANGS & CULTURES              | AC1  | FTX   | FT3  | PT - Assistant Professor | 8149    | BL-EALC |
| 26  | BL  | GRCH        | GRAND CHALLENGE                          | AC1  | FTX   | FT2  | PC - Associate Professor | 5539    | BL-EBIO |
| 27  | BL  | OADT        | BUSINESS OPERATIONS & DECISION TECHNOLOG | AC1  | FLX   | FL5  | TS - Senior Lecturer     | 11059   | BL-BUS  |
| 28  | BL  | CRIN        | CURRICULUM & INSTRUCTION                 | AC1  | FTX   | FT1  | PR - Professor           | 35      | BL-EDUC |
| 29  | BL  | EALC        | EAST ASIAN LANGS & CULTURES              | AC1  | FLX   | FL5  | TS - Senior Lecturer     | 34539   | BL-EALC |
| 30  | BL  | SOAD        | ESKENAZI SCHOOL OF ART ARCH + DESIGN     | AC1  | FTX   | AAM  |                          | 5359    | BL-SOAD |
| 31  | BL  | NELC        | MIDDLE EASTERN LANGUAGES AND CULTURE     | AC1  | FTX   | FT1  | PR - Professor           | 5379    | BL-NELC |
| 32  | BL  | MUCA        | CHORAL ENSEMBLE                          | AC1  | FTX   | FT2  | PC - Associate Professor | 6808    | BL-MUS  |
| 33  | BL  | NELC        | MIDDLE EASTERN LANGUAGES AND CULTURE     | AC1  | FLX   | FL5  | TL - Lecturer            | 27235   | BL-NELC |
| 34  | BL  | PSY         | PSYCHOLOGICAL & BRAIN SCIENCES           | AC1  | FTX   | FT1  | PR - Professor           | 28294   | BL-PSY  |
| 35  | BL  | ANTH        | ANTHROPOLOGY                             | AC1  | FTX   | FT3  | PT - Assistant Professor | 36612   | BL-ANTH |
| 36  | BL  | ENVR        | ENVIRONMENTAL AND OCCUPATIONAL HEALTH    | AC1  | RSS   | RSS  |                          | 36182   | BL-ENVR |
| 37  | BL  | SOC         | SOCIOLOGY                                | AC1  | FTX   | FT1  | PR - Professor           | 5581    | BL-SOC  |
| 38  | BL  | CPCS        | COMM, PROF, AND COMPUTER SKILL           | AC1  | FLX   | FL5  | TL - Lecturer            | 54762   | BL-BUS  |
| 39  | BL  | SPEA        | THE O'NEILL SCHOOL - BL SPEA             | AC1  | FLX   | FL5  | TL - Lecturer            | 27196   | BL-SPEA |

|                                      |    |      |                                       |        |     |     |                                  |  |       |         |
|--------------------------------------|----|------|---------------------------------------|--------|-----|-----|----------------------------------|--|-------|---------|
| 42                                   | BL | BCC  | BIostatistics Consulting Center       | AC1    | RSS | RSS |                                  |  | 31442 | BL-EBIO |
| 43                                   | BL | SPEA | THE O'NEILL SCHOOL - BL SPEA          | AC1    | FVX | FV5 | TL - Lecturer                    |  | 5609  | BL-SPEA |
| 44                                   | BL | SOC  | SOCIOLOGY                             | AC1    | FTX | AAM |                                  |  | 27527 | BL-SOC  |
| 45                                   | BL | HIST | HISTORY                               | AC1    | FTX | FT1 | PR - Professor                   |  | 5170  | BL-HIST |
| 46                                   | BL | MUAD | ADMINISTRATION - JACOBS               | AC1    | AAJ | AAJ |                                  |  | 44575 | BL-MUS  |
| 47                                   | BL | GNDR | GENDER STUDIES                        | AC1    | FTX | FT3 | PT - Assistant Professor         |  | 51109 | BL-GNDR |
| 48                                   | BL | SPHB | SCHOOL OF PUBLIC HEALTH - BLOOMINGTON | AC1    | AAI | AAI |                                  |  | 3654  | BL-SPHB |
| 49                                   | BL | HEWD | HEALTH AND WELLNESS DESIGN            | AC1    | FCX | FC3 | PT - Assistant Professor         |  | 34031 | BL-HEWD |
| 50                                   | BL | LAWS | MAURER SCHOOL OF LAW                  | AC1    | FTX | FT2 | PC - Associate Professor         |  | 5848  | BL-LAWS |
| 51                                   | BL | NELC | MIDDLE EASTERN LANGUAGES AND CULTURE  | AC1    | FLX | FLS | TS - Senior Lecturer             |  | 42190 | BL-NELC |
| 52                                   | BL | NELC | MIDDLE EASTERN LANGUAGES AND CULTURE  | AC1    | FTX | FT2 | PC - Associate Professor         |  | 5378  | BL-NELC |
| 53                                   | BL | ANTH | ANTHROPOLOGY                          | AC1    | FTX | AAM |                                  |  | 29834 | BL-ANTH |
| 54                                   | BL | CRIN | CURRICULUM & INSTRUCTION              | AC1    | FCX | FC3 | PT - Assistant Professor         |  | 7493  | BL-EDUC |
| 55                                   | BL | PSY  | PSYCHOLOGICAL & BRAIN SCIENCES        | AC1    | FVX | FV6 |                                  |  | 36198 | BL-PSY  |
| 56                                   | BL | AFRI | AFRICAN STUDIES PROGRAM               | AC1    | FTX | FT3 | PT - Assistant Professor         |  | 31489 | BL-AFRO |
| 57                                   | BL | SPHS | SPEECH & HEARING SCIENCES             | AC1    | FCX | FC2 | PC - Associate Professor         |  | 29214 | BL-SPHS |
| 58                                   | BL | SPEA | THE O'NEILL SCHOOL - BL SPEA          | AC1    | FTX | FT1 | PR - Professor                   |  | 5626  | BL-SPEA |
| 59                                   | BL | BI   | BIOLOGY                               | AC1    | FLX | FL5 | TL - Lecturer                    |  | 9848  | BL-BI   |
| 60                                   | BL | MSCH | MEDIA SCHOOL                          | AC1    | FTX | FT2 | PC - Associate Professor         |  | 42489 | BL-MSCH |
| 61                                   | BL | ENG  | ENGLISH                               | AC1    | FTX | FT2 | PC - Associate Professor         |  | 5093  | BL-ENG  |
| 62                                   | BL | TEED | TEACHER EDUCATION                     | AC1    | AAJ | AAJ |                                  |  | 5033  | BL-EDUC |
| 63                                   | BL | CPCS | COMM, PROF, AND COMPUTER SKILL        | AC1    | FLX | FL5 | TL - Lecturer                    |  | 54910 | BL-BUS  |
| 64                                   | BL | SPHS | SPEECH & HEARING SCIENCES             | AC1    | FTX | FT1 | PR - Professor                   |  | 5657  | BL-SPHS |
| 65                                   | BL | IIDC | IND INST ON DISABILITY/COMMNTY        | AC1    | RSX | RS3 | RT - Assistant Scientist;Scholar |  | 53220 | BL-IIDC |
| 66                                   | BL | SPHB | SCHOOL OF PUBLIC HEALTH - BLOOMINGTON | AC1    | UAS | AAM |                                  |  | 11207 | BL-SPHB |
| 67                                   | BL | ENG  | ENGLISH                               | AC1    | FTX | FT2 | PC - Associate Professor         |  | 5052  | BL-ENG  |
| 68                                   | BL | AMST | AMERICAN STUDIES                      | AC1    | FTX | FT2 | PC - Associate Professor         |  | 37206 | BL-AMST |
| 69                                   | BL | SPHS | SPEECH & HEARING SCIENCES             | AC1    | FTX | FT1 | PR - Professor                   |  | 5656  | BL-SPHS |
| 70                                   | BL | ACTG | ACCOUNTING DEPARTMENT                 | AC1    | FTX | FT3 | PT - Assistant Professor         |  | 54176 | BL-BUS  |
| 71                                   | BL | PSY  | PSYCHOLOGICAL & BRAIN SCIENCES        | AC1    | FVX | FV6 |                                  |  | 22783 | BL-PSY  |
| 72                                   | BL | IIDC | IND INST ON DISABILITY/COMMNTY        | AC1    | RSX | RS3 | RT - Assistant Scientist;Scholar |  | 52696 | BL-IIDC |
| 73                                   | BL | ACTG | ACCOUNTING DEPARTMENT                 | AC1    | FCX | FC3 | PT - Assistant Professor         |  | 52771 | BL-BUS  |
| 74                                   | BL | OAMH | ORGN OF AMERICAN HISTORIANS           | AC1    | UAS | UAS |                                  |  | 30644 | BL-OAMH |
| 75                                   | BL | INAD | SICE ADMINISTRATION                   | AC1    | FTX | FT3 | PT - Assistant Professor         |  | 4974  | BL-CSCI |
| 76                                   | BL | STAT | STATISTICS                            | AC1    | FVX | FV1 | PR - Professor                   |  | 45084 | BL-STAT |
| Position.Dept.Name Salary FTE Months |    |      |                                       |        |     |     |                                  |  |       |         |
| 1                                    |    |      | IUSM - BLOOMINGTON                    | 54835  | 1   | 12  |                                  |  |       |         |
| 2                                    |    |      | DEPARTMENT OF INFORMATICS             | 41200  | 1   | 12  |                                  |  |       |         |
| 3                                    |    |      | GENOMICS AND BIOINFORMATICS           | 58834  | 1   | 12  |                                  |  |       |         |
| 4                                    |    |      | MATHEMATICS                           | 47500  | 1   | 10  |                                  |  |       |         |
| 5                                    |    |      | EPIDEMIOLOGY AND BIostatistics        | 73250  | 1   | 12  |                                  |  |       |         |
| 6                                    |    |      | PHILOSOPHY                            | 97947  | 1   | 10  |                                  |  |       |         |
| 7                                    |    |      | DEPARTMENT OF INFORMATICS             | 361846 | 1   | 12  |                                  |  |       |         |
| 8                                    |    |      | ESKENAZI SCHOOL OF ART ARCH +         | 160000 | 1   | 10  |                                  |  |       |         |
| 9                                    |    |      | SCHOOL OF SOCIAL WORK                 | 59740  | 1   | 12  |                                  |  |       |         |

|    |                                |        |   |    |
|----|--------------------------------|--------|---|----|
| 9  | SCHOOL OF SOCIAL WORK          | 55740  | 1 | 12 |
| 10 | JACOBS SCHOOL OF MUSIC         | 78000  | 1 | 10 |
| 11 | ENGLISH                        | 119036 | 1 | 10 |
| 12 | PHILOSOPHY                     | 79898  | 1 | 10 |
| 13 | PSYCHOLOGICAL & BRAIN SCIENCES | 37370  | 1 | 12 |
| 14 | CINEMA & MEDIA STUDIES         | 94822  | 1 | 10 |
| 15 | THE O'NEILL SCHOOL - BL SPEA   | 113345 | 1 | 10 |
| 16 | MIDDLE EASTERN LANGUAGES AND C | 144466 | 1 | 10 |
| 17 | MATHEMATICS                    | 53000  | 1 | 10 |
| 18 | EDUCATION                      | 77462  | 1 | 10 |
| 19 | APPLIED HEALTH SCIENCE         | 155864 | 1 | 10 |
| 20 | APPLIED HEALTH SCIENCE         | 97679  | 1 | 10 |
| 21 | LAW LIBRARY                    | 89554  | 1 | 12 |
| 22 | BIOLOGY                        | 37370  | 1 | 12 |
| 23 | DEPARTMENT OF INFORMATICS      | 143089 | 1 | 10 |
| 24 | KELLEY SCHOOL OF BUSINESS      | 115000 | 1 | 10 |
| 25 | EAST ASIAN LANGS & CULTURES    | 83005  | 1 | 10 |
| 26 | EPIDEMIOLOGY AND BIOSTATISTICS | 139463 | 1 | 10 |
| 27 | KELLEY SCHOOL OF BUSINESS      | 95000  | 1 | 10 |
| 28 | EDUCATION                      | 135523 | 1 | 10 |
| 29 | EAST ASIAN LANGS & CULTURES    | 64322  | 1 | 10 |
| 30 | ESKENAZI SCHOOL OF ART ARCH +  | 89446  | 1 | 10 |
| 31 | MIDDLE EASTERN LANGUAGES AND C | 95627  | 1 | 10 |
| 32 | JACOBS SCHOOL OF MUSIC         | 76688  | 1 | 10 |
| 33 | MIDDLE EASTERN LANGUAGES AND C | 53774  | 1 | 10 |
| 34 | PSYCHOLOGICAL & BRAIN SCIENCES | 184226 | 1 | 10 |
| 35 | ANTHROPOLOGY                   | 81563  | 1 | 10 |
| 36 | ENVIRONMENTAL AND OCCUPATIONAL | 65000  | 1 | 12 |
| 37 | SOCIOLOGY                      | 141775 | 1 | 10 |
| 38 | KELLEY SCHOOL OF BUSINESS      | 62500  | 1 | 10 |
| 39 | THE O'NEILL SCHOOL - BL SPEA   | 70860  | 1 | 10 |
| 40 | ECONOMICS                      | 176875 | 1 | 10 |
| 41 | LIBRARIES                      | 67000  | 1 | 12 |
| 42 | EPIDEMIOLOGY AND BIOSTATISTICS | 65207  | 1 | 12 |
| 43 | THE O'NEILL SCHOOL - BL SPEA   | 79374  | 1 | 10 |
| 44 | SOCIOLOGY                      | 108039 | 1 | 10 |
| 45 | HISTORY                        | 151719 | 1 | 10 |
| 46 | JACOBS SCHOOL OF MUSIC         | 172525 | 1 | 12 |
| 47 | GENDER STUDIES                 | 81910  | 1 | 10 |
| 48 | SCHOOL OF PUBLIC HEALTH - BLOO | 486236 | 1 | 12 |
| 49 | HEALTH AND WELLNESS DESIGN     | 82193  | 1 | 10 |
| 50 | MAURER SCHOOL OF LAW           | 156187 | 1 | 10 |
| 51 | MIDDLE EASTERN LANGUAGES AND C | 62225  | 1 | 10 |
| 52 | MIDDLE EASTERN LANGUAGES AND C | 95213  | 1 | 10 |
| 53 | ANTHROPOLOGY                   | 97570  | 1 | 10 |

|    |                                |        |   |    |
|----|--------------------------------|--------|---|----|
| 54 | EDUCATION                      | 65000  | 1 | 10 |
| 55 | PSYCHOLOGICAL & BRAIN SCIENCES | 56800  | 1 | 12 |
| 56 | AFRICAN AMER & AFRICAN DIASPOR | 78000  | 1 | 10 |
| 57 | SPEECH & HEARING SCIENCES      | 92236  | 1 | 12 |
| 58 | THE O'NEILL SCHOOL - BL SPEA   | 188897 | 1 | 10 |
| 59 | BIOLOGY                        | 60000  | 1 | 10 |
| 60 | MEDIA SCHOOL                   | 79402  | 1 | 10 |
| 61 | ENGLISH                        | 91451  | 1 | 10 |
| 62 | EDUCATION                      | 160126 | 1 | 12 |
| 63 | KELLEY SCHOOL OF BUSINESS      | 68000  | 1 | 10 |
| 64 | SPEECH & HEARING SCIENCES      | 122649 | 1 | 10 |
| 65 | IND INST ON DISABILITY/COMMNTY | 77250  | 1 | 12 |
| 66 | SCHOOL OF PUBLIC HEALTH - BLOO | 67809  | 1 | 12 |
| 67 | ENGLISH                        | 77214  | 1 | 10 |
| 68 | AMERICAN STUDIES               | 94294  | 1 | 10 |
| 69 | SPEECH & HEARING SCIENCES      | 127272 | 1 | 10 |
| 70 | KELLEY SCHOOL OF BUSINESS      | 241000 | 1 | 10 |
| 71 | PSYCHOLOGICAL & BRAIN SCIENCES | 60000  | 1 | 12 |
| 72 | IND INST ON DISABILITY/COMMNTY | 76282  | 1 | 12 |
| 73 | KELLEY SCHOOL OF BUSINESS      | 173040 | 1 | 10 |
| 74 | ORGN OF AMERICAN HISTORIANS    | 74656  | 1 | 12 |
| 75 | COMPUTER SCIENCE               | 115000 | 1 | 10 |
| 76 | STATISTICS                     | 65000  | 1 | 10 |

[ reached 'max' / getOption("max.print") -- omitted 2958 rows ]

```

> # Initialize the "salary" variable with Dr. Luen's salary
> salary <- 81902
>
> # Read the data from the CSV file
> salary_data <- read.csv("IUSalaries2023.csv")
> salary_data

```

|    | COA | Org  | Funding.Org.Name                         | Plan | Grade | Post | Class                    | Pos.Nbr | Dept.ID |
|----|-----|------|--|------|-------|------|--------------------------|---------|---------|
| 1  | BL  | MSCI | IUSM - BLOOMINGTON                       | AC1  | FVX   | FV8  |                          | 53730   | IN-MSCI |
| 2  | BL  | INFI | DEPARTMENT OF INFORMATICS                | AC1  | RSP   | RSP  |                          | 48823   | BL-INFI |
| 3  | BL  | CGB  | CGB SEQUENCING FACILITY                  | AC1  | RSS   | RSS  |                          | 28414   | BL-CGBI |
| 4  | BL  | MATH | MATHEMATICS                              | AC1  | FVX   |      |                          | 745     | BL-MATH |
| 5  | BL  | EBIO | EPIDEMIOLOGY AND BIOSTATISTICS           | AC1  | RSS   | RSS  |                          | 9991    | BL-EBIO |
| 6  | BL  | PL   | PHILOSOPHY                               | AC1  | FTX   | AAM  |                          | 13396   | BL-PL   |
| 7  | BL  | INFI | DEPARTMENT OF INFORMATICS                | AC1  | FTX   | FT1  | PR - Professor           | 53583   | BL-INFI |
| 8  | BL  | SOAD | ESKENAZI SCHOOL OF ART ARCH + DESIGN     | AC1  | FTX   | FT1  | PR - Professor           | 54488   | BL-SOAD |
| 9  | BL  | SOCW | SCHOOL OF SOCIAL WORK                    | AC1  | FVX   | FV5  | TL - Lecturer            | 12276   | IN-SOCW |
| 10 | BL  | MUTH | MUSIC THEORY                             | AC1  | FTX   | FT2  | PC - Associate Professor | 5962    | BL-MUS  |
| 11 | BL  | ENG  | ENGLISH                                  | AC1  | FTX   | AAL  |                          | 5048    | BL-ENG  |
| 12 | BL  | PL   | PHILOSOPHY                               | AC1  | FTX   | FT3  | PT - Assistant Professor | 5453    | BL-PL   |
| 13 | BL  | PSY  | PSYCHOLOGICAL & BRAIN SCIENCES           | AC1  | FVX   | FV8  |                          | 29072   | BL-PSY  |
| 14 | BL  | CIMS | CINEMA & MEDIA STUDIES                   | AC1  | FTX   | FT2  | PC - Associate Professor | 42519   | BL-CIMS |
| 15 | BL  | SPEA | THE O'NEILL SCHOOL - BL SPEA             | AC1  | FCX   | FC1  | PR - Professor           | 8171    | BL-SPEA |
| 16 | BL  | NELC | MIDDLE EASTERN LANGUAGES AND CULTURE     | AC1  | FTX   | FT1  | PR - Professor           | 28698   | BL-NELC |
| 17 | BL  | MATH | MATHEMATICS                              | AC1  | FLX   | FL5  | TL - Lecturer            | 26799   | BL-MATH |
| 18 | BL  | CEDP | COUNSELING & EDUCATIONAL PSY             | AC1  | FTX   | FT3  | PT - Assistant Professor | 5689    | BL-EDUC |
| 19 | BL  | APHS | APPLIED HEALTH SCIENCE                   | AC1  | FTX   | FT2  | PC - Associate Professor | 4690    | BL-APHS |
| 20 | BL  | APHS | APPLIED HEALTH SCIENCE                   | AC1  | FTX   | FT3  | PT - Assistant Professor | 4698    | BL-APHS |
| 21 | BL  | LAWL | LAW LIBRARY                              | AC1  | LTX   | LT2  | LC - Associate Librarian | 18019   | BL-LAWL |
| 22 | BL  | BI   | BIOLOGY                                  | AC1  | RSS   | RSS  |                          | 878     | BL-BI   |
| 23 | BL  | INFI | DEPARTMENT OF INFORMATICS                | AC1  | FTX   | FT1  | PR - Professor           | 26761   | BL-INFI |
| 24 | BL  | BEPP | DEPT OF ECONOMICS & PUBLIC POLICY        | AC1  | FVX   | FV3  | PT - Assistant Professor | 54605   | BL-BUS  |
| 25 | BL  | EALC | EAST ASIAN LANGS & CULTURES              | AC1  | FTX   | FT3  | PT - Assistant Professor | 8149    | BL-EALC |
| 26 | BL  | GRCH | GRAND CHALLENGE                          | AC1  | FTX   | FT2  | PC - Associate Professor | 5539    | BL-EBIO |
| 27 | BL  | OADT | BUSINESS OPERATIONS & DECISION TECHNOLOG | AC1  | FLX   | FLS  | TS - Senior Lecturer     | 11059   | BL-BUS  |
| 28 | BL  | CRIN | CURRICULUM & INSTRUCTION                 | AC1  | FTX   | FT1  | PR - Professor           | 35      | BL-EDUC |
| 29 | BL  | EALC | EAST ASIAN LANGS & CULTURES              | AC1  | FLX   | FLS  | TS - Senior Lecturer     | 34539   | BL-EALC |
| 30 | BL  | SOAD | ESKENAZI SCHOOL OF ART ARCH + DESIGN     | AC1  | FTX   | AAM  |                          | 5359    | BL-SOAD |
| 31 | BL  | NELC | MIDDLE EASTERN LANGUAGES AND CULTURE     | AC1  | FTX   | FT1  | PR - Professor           | 5379    | BL-NELC |
| 32 | BL  | MUCA | CHORAL ENSEMBLE                          | AC1  | FTX   | FT2  | PC - Associate Professor | 6008    | BL-MUS  |
| 33 | BL  | NELC | MIDDLE EASTERN LANGUAGES AND CULTURE     | AC1  | FLX   | FL5  | TL - Lecturer            | 27235   | BL-NELC |
| 34 | BL  | PSY  | PSYCHOLOGICAL & BRAIN SCIENCES           | AC1  | FTX   | FT1  | PR - Professor           | 28294   | BL-PSY  |
| 35 | BL  | ANTH | ANTHROPOLOGY                             | AC1  | FTX   | FT3  | PT - Assistant Professor | 36612   | BL-ANTH |
| 36 | BL  | ENVR | ENVIRONMENTAL AND OCCUPATIONAL HEALTH    | AC1  | RSS   | RSS  |                          | 36182   | BL-ENVR |
| 37 | BL  | SOC  | SOCIOLOGY                                | AC1  | FTX   | FT1  | PR - Professor           | 5581    | BL-SOC  |
| 38 | BL  | CPCS | COMM, PROF, AND COMPUTER SKILL           | AC1  | FLX   | FL5  | TL - Lecturer            | 54762   | BL-BUS  |

|    |         |                                       |     |     |     |                                  |       |         |
|----|---------|---------------------------------------|-----|-----|-----|----------------------------------|-------|---------|
| 40 | BL ECON | ECONOMICS                             | AC1 | FTX | FT1 | PR - Professor                   | 8516  | BL-ECON |
| 41 | BL LREF | SCHOLARS COMMONS                      | AC1 | LTX | LT2 | LC - Associate Librarian         | 16678 | BL-LIBR |
| 42 | BL BCC  | BIOSTATISTICS CONSULTING CENTER       | AC1 | RSS | RSS |                                  | 31442 | BL-EBIO |
| 43 | BL SPEA | THE O'NEILL SCHOOL - BL SPEA          | AC1 | FVX | FV5 | TL - Lecturer                    | 5609  | BL-SPEA |
| 44 | BL SOC  | SOCIOLOGY                             | AC1 | FTX | AAM |                                  | 27527 | BL-SOC  |
| 45 | BL HIST | HISTORY                               | AC1 | FTX | FT1 | PR - Professor                   | 5170  | BL-HIST |
| 46 | BL MUAD | ADMINISTRATION - JACOBS               | AC1 | AAJ | AAJ |                                  | 44575 | BL-MUS  |
| 47 | BL GNDR | GENDER STUDIES                        | AC1 | FTX | FT3 | PT - Assistant Professor         | 51109 | BL-GNDR |
| 48 | BL SPHB | SCHOOL OF PUBLIC HEALTH - BLOOMINGTON | AC1 | AAI | AAI |                                  | 3654  | BL-SPHB |
| 49 | BL HEWD | HEALTH AND WELLNESS DESIGN            | AC1 | FCX | FC3 | PT - Assistant Professor         | 34031 | BL-HEWD |
| 50 | BL LAWS | MAURER SCHOOL OF LAW                  | AC1 | FTX | FT2 | PC - Associate Professor         | 5848  | BL-LAWS |
| 51 | BL NELC | MIDDLE EASTERN LANGUAGES AND CULTURE  | AC1 | FLX | FL5 | TS - Senior Lecturer             | 42190 | BL-NELC |
| 52 | BL NELC | MIDDLE EASTERN LANGUAGES AND CULTURE  | AC1 | FTX | FT2 | PC - Associate Professor         | 5378  | BL-NELC |
| 53 | BL ANTH | ANTHROPOLOGY                          | AC1 | FTX | AAM |                                  | 29834 | BL-ANTH |
| 54 | BL CRIN | CURRICULUM & INSTRUCTION              | AC1 | FCX | FC3 | PT - Assistant Professor         | 7493  | BL-EDUC |
| 55 | BL PSY  | PSYCHOLOGICAL & BRAIN SCIENCES        | AC1 | FVX | FV6 |                                  | 36198 | BL-PSY  |
| 56 | BL AFRI | AFRICAN STUDIES PROGRAM               | AC1 | FTX | FT3 | PT - Assistant Professor         | 31489 | BL-AFRO |
| 57 | BL SPHS | SPEECH & HEARING SCIENCES             | AC1 | FCX | FC2 | PC - Associate Professor         | 29214 | BL-SPHS |
| 58 | BL SPEA | THE O'NEILL SCHOOL - BL SPEA          | AC1 | FTX | FT1 | PR - Professor                   | 5626  | BL-SPEA |
| 59 | BL BI   | BIOLOGY                               | AC1 | FLX | FL5 | TL - Lecturer                    | 9848  | BL-BI   |
| 60 | BL MSCH | MEDIA SCHOOL                          | AC1 | FTX | FT2 | PC - Associate Professor         | 42489 | BL-MSCH |
| 61 | BL ENG  | ENGLISH                               | AC1 | FTX | FT2 | PC - Associate Professor         | 5093  | BL-ENG  |
| 62 | BL TEED | TEACHER EDUCATION                     | AC1 | AAJ | AAJ |                                  | 5033  | BL-EDUC |
| 63 | BL CPCS | COMM, PROF, AND COMPUTER SKILL        | AC1 | FLX | FL5 | TL - Lecturer                    | 54910 | BL-BUS  |
| 64 | BL SPHS | SPEECH & HEARING SCIENCES             | AC1 | FTX | FT1 | PR - Professor                   | 5657  | BL-SPHS |
| 65 | BL IIDC | IND INST ON DISABILITY/COMMNTY        | AC1 | RSX | RS3 | RT - Assistant Scientist;Scholar | 53220 | BL-IIDC |
| 66 | BL SPHB | SCHOOL OF PUBLIC HEALTH - BLOOMINGTON | AC1 | UAS | AAM |                                  | 11207 | BL-SPHB |
| 67 | BL ENG  | ENGLISH                               | AC1 | FTX | FT2 | PC - Associate Professor         | 5052  | BL-ENG  |
| 68 | BL AMST | AMERICAN STUDIES                      | AC1 | FTX | FT2 | PC - Associate Professor         | 37206 | BL-AMST |
| 69 | BL SPHS | SPEECH & HEARING SCIENCES             | AC1 | FTX | FT1 | PR - Professor                   | 5656  | BL-SPHS |
| 70 | BL ACTG | ACCOUNTING DEPARTMENT                 | AC1 | FTX | FT3 | PT - Assistant Professor         | 54176 | BL-BUS  |
| 71 | BL PSY  | PSYCHOLOGICAL & BRAIN SCIENCES        | AC1 | FVX | FV6 |                                  | 22783 | BL-PSY  |
| 72 | BL IIDC | IND INST ON DISABILITY/COMMNTY        | AC1 | RSX | RS3 | RT - Assistant Scientist;Scholar | 52696 | BL-IIDC |
| 73 | BL ACTG | ACCOUNTING DEPARTMENT                 | AC1 | FCX | FC3 | PT - Assistant Professor         | 52771 | BL-BUS  |
| 74 | BL OAMH | ORGN OF AMERICAN HISTORIANS           | AC1 | UAS | UAS |                                  | 30644 | BL-OAMH |
| 75 | BL INAD | SICE ADMINISTRATION                   | AC1 | FTX | FT3 | PT - Assistant Professor         | 4974  | BL-CSCI |
| 76 | BL STAT | STATISTICS                            | AC1 | FVX | FV1 | PR - Professor                   | 45084 | BL-STAT |

  

|   | Position | Dept.Name                      | Salary | FTE | Months |
|---|----------|--------------------------------|--------|-----|--------|
| 1 |          | IUSM - BLOOMINGTON             | 54835  | 1   | 12     |
| 2 |          | DEPARTMENT OF INFORMATICS      | 41200  | 1   | 12     |
| 3 |          | GENOMICS AND BIOINFORMATICS    | 58834  | 1   | 12     |
| 4 |          | MATHEMATICS                    | 47500  | 1   | 10     |
| 5 |          | EPIDEMIOLOGY AND BIostatistics | 73250  | 1   | 12     |
| 6 |          | PHILOSOPHY                     | 97947  | 1   | 10     |

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43 THE O'NEILL SCHOOL - BL SPEA 15517 1 10
44 SOCIOLOGY 108039 1 10
45 HISTORY 151719 1 10
46 JACOBS SCHOOL OF MUSIC 172525 1 12
47 GENDER STUDIES 81910 1 10
48 SCHOOL OF PUBLIC HEALTH - BLOO 486236 1 12
49 HEALTH AND WELLNESS DESIGN 82193 1 10
50 MAURER SCHOOL OF LAW 156187 1 10
51 MIDDLE EASTERN LANGUAGES AND C 62225 1 10
52 MIDDLE EASTERN LANGUAGES AND C 95213 1 10
53 ANTHROPOLOGY 97570 1 10
54 EDUCATION 65000 1 10
55 PSYCHOLOGICAL & BRAIN SCIENCES 56800 1 12
56 AFRICAN AMER & AFRICAN DIASPOR 78000 1 10
57 SPEECH & HEARING SCIENCES 92236 1 12
58 THE O'NEILL SCHOOL - BL SPEA 188897 1 10
59 BIOLOGY 60000 1 10
60 MEDIA SCHOOL 79402 1 10
61 ENGLISH 91451 1 10
62 EDUCATION 160126 1 12
63 KELLEY SCHOOL OF BUSINESS 68000 1 10
64 SPEECH & HEARING SCIENCES 122649 1 10
65 IND INST ON DISABILITY/COMMNTY 77250 1 12
66 SCHOOL OF PUBLIC HEALTH - BLOO 67809 1 12
67 ENGLISH 77214 1 10
68 AMERICAN STUDIES 94294 1 10
69 SPEECH & HEARING SCIENCES 127272 1 10
70 KELLEY SCHOOL OF BUSINESS 241000 1 10
71 PSYCHOLOGICAL & BRAIN SCIENCES 60000 1 12
72 IND INST ON DISABILITY/COMMNTY 76282 1 12
73 KELLEY SCHOOL OF BUSINESS 173040 1 10
74 ORGN OF AMERICAN HISTORIANS 74656 1 12
75 COMPUTER SCIENCE 115000 1 10
76 STATISTICS 65000 1 10
[ reached 'max' / getOption("max.print") -- omitted 2958 rows ]
>
> # Calculate the percentile rank
> percentile_rank <- sum(salary_data$Salary <= salary) / length(salary_data$Salary) * 100
> percentile_rank
[1] 38.0356
>
> # Print the percentile rank
> cat("The percentile rank of Dr. Luen's salary is:", percentile_rank, "%")
The percentile rank of Dr. Luen's salary is: 38.0356 %

```

=> 38.0356%

6. Fill in the file fly-wings.Rmd, replacing the ??????s with appropriate content. Knit the file to HTML or PDF, and upload this knitted file as part of your submission.

>> SEPARATE PDF UPLOADED