

بسم الله الرحمن الرحيم

تمرینات سری دوم

مهلت ارسال: ۲۶ آبان ماه

دستورالعمل: خروجی نتایج خود را بارگذاری کنید. همچنین بارگذاری خود کد آر و نتایج مربوط به تفاسیر نیز الزامی است. (سه پارامتر موثر در نمره دهی، تفسیر نتایج، خروجی کدها و نوشتن خود کدها می باشد).

شباهت بین پاسخ های افراد مختلف کاملاً در نظر گرفته می شود و باعث کسر نمره خواهد بود.

1. A study measures productivity scores from workers under: Two shift times and Two noise levels. Choose and do the appropriate test for consideration of is there any difference between various levels of our variables and also interaction of them?

```
data <- data.frame(  
  shift = factor(rep(c("Day", "Night"), each=20)),  
  noise = factor(rep(rep(c("Low", "High"), each=10), 2)),  
  productivity = c(56, 58, 57, 59, 58, 58, 57, 56, 57, 55,  
    88, 85, 52, 84, 87, 45, 86, 58, 83, 84,  
    61, 70, 47, 50, 88, 56, 90, 79, 69, 55, 58, 65, 47, 66, 53, 70, 67, 83, 61, 60))
```

2. Four machines produce different tensile strengths of metal rods. Check if machines differ. Use boxplot to plot them.

```
imachine1 <- c(25, 26, 24, 27, 26, 28, 25, 27, 26, 24)  
machine2 <- c(20, 22, 19, 21, 23, 20, 24, 22, 21, 23)  
machine3 <- c(35, 36, 34, 37, 36, 35, 60, 62, 61, 59)  
machine4 <- c(30, 31, 29, 32, 28, 27, 26, 25, 24, 100)
```

3. 10 students' reaction times are measured under 3 caffeine doses (0mg, 100mg, 200mg). Consider is there any difference between these various doses of caffeine. (Hint: You can use data frame of your data, build and use it.)

```

reaction <- matrix(
  c(350,320,300,
    400,370,340,
    360,330,310,
    370,350,320,
    390,360,330,
    380,350,325,
    365,340,310,
    375,345,315,
    355,330,300,
    360,335,305),
  ncol=3, byrow=TRUE
)
colnames(reaction) <- c("NoCaffeine", "100mg", "200mg")

```

4. Do the accurate test for question 3 in your previous assignment.
 5. Do the accurate test for question 7 in your previous assignment.
 6. Researchers investigate whether BRCA1 and BRCA2 gene expression levels are linearly related in each other or not? (Be careful, which test is desirable here?) Build your dataframe.
- Do it one time as a whole, and one time in females.

```

BRCA1_expression <- c(
  9.32, 11.14, 10.56, 7.83, 8.97, 12.25, 9.88, 11.47, 10.15, 8.44,
  9.76, 10.93, 11.38, 7.95, 9.05, 10.64, 8.71, 9.42, 11.77, 10.02,
  8.86, 10.57, 9.61, 11.03, 8.32, 10.74, 9.89, 12.05, 9.54, 10.11,
  8.59, 11.21, 10.45, 9.07, 8.95, 11.62, 10.28, 9.73, 11.09, 9.68
)

```

```
BRCA2_expression <- c(
  9.89, 11.92, 11.38, 8.54, 9.42, 12.97, 10.33, 12.21, 10.72, 9.07,
  10.14, 11.54, 11.89, 8.66, 9.77, 11.26, 9.42, 9.91, 12.44, 10.58,
  9.52, 11.35, 10.17, 11.73, 9.01, 11.48, 10.49, 12.74, 10.22, 10.87,
  9.33, 11.84, 11.03, 9.66, 9.47, 12.19, 10.97, 10.22, 11.56, 10.41
)
gender= rep(c("female", "male"), each = 20)
```

7. Test the relationship between study hours and score ranks of students. Interpret it and write if it is positive or negative?

```
hours <- c(2, 3, 4, 5, 1, 6, 7, 3, 4, 8, 2, 5, 6, 7, 8)
exam_rank <- c(15, 13, 12, 10, 14, 9, 7, 11, 12, 5, 14, 9, 8, 6, 4)
```

8. The question is if the median women's weight differs from the median men's weight in the below data?

```
women_weight <- c(38.9, 61.2, 73.3, 21.8, 63.4, 64.6, 48.4, 48.8, 48.5)
men_weight <- c(67.8, 60, 63.4, 76, 89.4, 73.3, 67.3, 61.3, 62.4)
```

9. Comparing Customer Ratings Across Service Centers with the suitable Test.

A company surveyed client satisfaction (on a 1-10 scale) after service at three branches. The ratings are:

Branch A: 4, 5, 7, 6, 3, 4, 5

Branch B: 8, 9, 7, 8, 7, 8, 7

Branch C: 3, 2, 1, 4, 3, 2, 3

Test whether satisfaction scores differ by branch.

10. Five patients try four painkillers. Each rates pain on a scale 0-10. Do scores differ between drugs?(after knowing your assumption, do and TELL what is the appropriate test. However, do also another one parametric or nonparametric for practice)

Patient =1:5

Drug A: 8,7,9,10,8

Drug B: 6,5,8,8,7

Drug C: 8,8,8,7,7

Drug D: 5,6,6,7,7