MS9001 : Assignment 2

Objectives

In this assignment, you will be expected to:

- Formulate a research question involving two or more samples.
- Plan and collect data that will answer your question.
- Use Minitab (or any statistical software) to perform data analyses.
- Interpret the results.

Grading Criteria

This assignment constitutes 15% of assessment components.
Maximum mark attainable is 50 marks. The grading rubric is as follows:

Component	Competent	Typical	Novice
Research Question (5 marks)	Either, RQ is interesting and piques curiosity. Or, RQ is very relevant and applicable to work or life. [4−5m]	Either, RQ is somewhat interesting. Or, RQ is somewhat relevant to work or life. [2−3m]	RQ is nether interesting nor relevant to work or life. [1m]
Data Collection (5 marks)	Data is well-collected and sufficient. [4−5m]	Data collected is sufficient. [2−3m]	Data collected is insufficient. [1m]
Data Analyses (25 marks)	Relevant numerical and graphical summaries are presented. [4−5m]	Too many or too few numerical or graphical summaries are presented. [2−3m]	No numerical and graphical summaries are presented. [0m]
	Assumptions are checked. [4−5m]	Assumptions are partially checked. [2−3m]	Assumptions are not checked. [0m]
	Appropriate test is selected, and results are comprehensively presented. [11−15m]	Appropriate test is selected, but results are partially presented. [6−10m]	Test selected is not appropriate. [1−5m]
Interpret Results (10 marks)	Interpretation is rational, and conclusion is valid. [7−10m]	Interpretation is somewhat rational, and conclusion is somewhat valid. [4−6m]	Interpretation is irrational, and conclusion is not valid. [1−3m]
Others (5 marks)	References are provided. [2m]	Inadequate references are provided. [1m]	No references are provided. [0m]
	Length of report is between 2 to 4 pages. [3m]		Report is too long or too short. [0m]

Tasks

(1) Formulate your research question

Your research question (RQ) should involve comparison of samples drawn from two or more populations. You can scan newspapers, journals, online articles and data sites for "inspiration" or support your RQ; just remember to reference.

Some examples of RQs:
- Is there a difference in the mean BMI of male and female adults?
- Is there a difference in the average resting heart rate of the youth, the middle-aged and the seniors?
- Is the index finger on a person's dominant hand longer than index finger on non-dominant hand on average?
- Are the typical life expectancies of Chinese, Malay and Indian different?
- Is there a difference in the average night temperature between Yishun, Pasir Ris, Jurong and Sentosa?
- Are the average trip costs of Grab, Comfort and City Cab the same?

(2) Plan and collect data

- How are you going to obtain your data? You may source for existing data, or collect your own (by measurement or survey).
- What is your sample? What is the population? What is your sampling method? What is the sample size? What are the types of data collected?
- Before actual collection of data, briefly explain your RQ and plan to your tutor to ensure that you are on track.

(3) Analyze your data

- Use Minitab to analyze your data.
- Select the level of significance.
- Check for normality.
- Produce relevant numerical and graphical summaries.
- Perform one of the following hypothesis tests:
  - Paired t-test
  - Two-sample independent t-test (with F-test for ratio of variances)
  - ANOVA F-test (with Levene's Test for checking of Assumption 3 on equal variances and appropriate Multiple Comparison Test if applicable)
- What possible errors (Type I/II) could be committed?

You may use other statistical software, but note that your tutor will not be able to advise you on the technicality of the software other than Minitab.

(4) Interpret the results

- With the results, answer your RQ.
- Write an informal report in **at most 4 pages**, inclusive of graphs.
- Point-form is allowed.
- State references, if any.

Resources

You can use your own dataset that you may have, or refer to the following:

- https://www.data.gov.sg
- https://www.data.gov
- https://www.kaggle.com/datasets