



UNIVERSITAS ISLAM INDONESIA
FAKULTAS MIPA
Jl. Kaliurang Km. 14,5 Jogjakarta

FINAL EXAM ACADEMIC YEAR 2020/2021

Course : Simulation Techniques
Study Program /Class : Statistics/A, B
Day/Date : Monday, 11 January 2021
Time : 120 minutes
Lecturer : Muhammad Hasan Sidiq K, M.Sc.
Exam Description : Opened Book
Online Media : Google Classroom

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

And everyone gets a level according to what they have done and so that Allah will suffice for their deeds and they will not be harmed.

(Al-Ahqof 19)

INSTRUCTIONS:

1. All answers are handwritten on paper, scanned and uploaded in PDF format.
2. **You can use software R and Microsoft Excel to help the calculation process.**
3. The PDF file naming format is: NIM_NAMA_TEKSIM(UAS).
4. The file must be uploaded no later than 1.15 p.m WIB (Waktu Indonesia Barat). Late upload of answers will result in a reduction in grades.
5. Don't forget to write your name in your answer file.
6. Work honestly and independently.
7. Write this statement on your test answer sheet and put your signature:
"In the name of Allah, the Most Gracious and Most Merciful, I declare that in the final semester exam of this course, I promise to take the exam honestly, independently, not to cooperate with each other, and not to cheat in any form."
8. **If statement number 7 is not written completely or without a signature, the test sheet will not be viewed.**

PLO: Able to design experiments, collect and generate data (in the form of surveys, experiments, or simulations), organize data, analyze data using statistical techniques, and draw valid conclusions, using at least one statistical software.

LO: Students are able to use statistical techniques to calculate solutions using simulation techniques.

Indicator: Students are able to choose the simulation method that suits the data.

Pray first and don't be in a hurry ☺.

1. You are given Covid-19 sufferers data on the island of Java on December 29, 2020 (bnpb-inacovid19.hub.arcgis.com):

Table 1. Number of Covid-19 Patients on the Island of Java

Province	Number of Recovered	Number of Death
DKI Jakarta	161243	3228
Jawa Barat	68353	732
Jawa Tengah	53428	3422
Daerah Istimewa Yogyakarta	7718	249
Jawa Timur	70467	5701
Banten	10309	418

- a. **(Points: 30)** Run a simulation (10 repetitions) to test whether the average number of Recovered is greater than the average number of Death. Write down the steps in full.
- b. **(Points: 30)** Calculate the correlation between the variables Recovered and Number of Deaths. Investigate using a simulation (3 repetitions), whether the estimated correlation you get is biased or unbiased. Write down the steps in full.

2. **(Points: 25)** You are given the number of positive Covid-19 cases data on the islands of Kalimantan and Sulawesi on December 29, 2020 (bnpb-inacovid19.hub.arcgis.com):

Table 2. Number of Positive Cases of Covid-19 in Kalimantan and Sulawesi

Province	Kalimantan	Provinsi ke-	Sulawesi
1	3078	1	9549
2	9616	2	3188
3	15163	3	18372
4	26393	4	7806
5	3684	5	3688
		6	1896

Run a simulation with 5 repetitions to find out whether the range of the number of positive cases on the island of Kalimantan is the same as the range of the number of positive cases on the island of Sulawesi. Write down the steps in full.

3. **(Points: 15)** Referring to Table 2. if the data on the number of positive cases on Sulawesi Island are assumed to be Poisson distributed, perform a parametric simulation (5 times

iterations) to estimate the 1st quartile (Q1) and the standard error. Write down the steps in full.

-o0o-

The verification of Final Exam, Odd Academic Year 2020/2021				
The suitability of the problems with CO	The Completeness of the problems information	Verifier	Verification date	Sign
Suitable/ Less suitable / Not Suitable	Complete/ Less Complete / Not Complete	Science cluster coordinator	5-Nov-2020	