



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

ODD MIDTERM EXAM ACADEMIC YEAR 2019/2020

Course Name : Computational statistics
Study Program/Class : Statistics/ A
Day/Date : Saturday/July 11, 2020
Duration : 100 minutes
Lecture : Rahmadi Yotenka S.Si., M.Sc
Online Media Used : Google Classroom

LO :

KKa: 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.

KKb: Ability to solve problems assessment(estimation),testing hypotheses, predictions and forecasts(forecasting)in some areas, using data and some statistical methodology (methods and models) and represent it in the description easily understood by users.

Question number 1 [Score = 60]
CO: KKa1: Students are able to perform simulations using random numbers and draw appropriate conclusions based on statistical computations
Indicator: a. Students are able to generate random numbers and perform simulations based on statistical distributions using R software
Instructions/question materials: Monte Carlo Simulation with R

1. a. What is a Monte Carlo Simulation, give an example of its implementation in a particular field of science!
- b. A sports shop estimates the daily demand for badminton shoes according to the following distribution pattern:

No	Demand/day	Frequency of demand
1	Less than 4 pairs	5
2	4 pairs	5
3	5 pairs	10
4	6 pairs	15
5	7 pairs	20
6	8 pairs	25
7	9 pairs	15
8	More than 9 pairs	5
	Total	100

From past data it can be estimated well. Then the shopkeeper wants to estimate the pattern of demand for the next 10 days. Determine how many pairs of badminton shoes must be in stock in the warehouse to serve customer requests in the next 10 days!
Write a program using R language to do a monte carlo simulation for this data!

- c. For example, for the data above there are two shoe brands with an average percentage of shoes sold according to their distribution of 25 percent and 75 percent, determine the estimated demand pattern for the next 10 days for each shoe brand!
Write a program using R language to do a monte carlo simulation for this data!

Question number 2 [Score = 40]

CO:

KKb1: Students are able to make an estimation program for statistical distribution parameters

Indicator:

- a. Students are able to make a root estimation program using the Newton-Raphson method with R software

Instructions/material questions:

Newton Raphson method for estimating the roots of equations with R

2. Perform the built-in function program R using the Newton Raphson method to estimate the roots of the equation (Write the syntax and output):
- a. $f(x) = e^x - \sin(x)$, Use initial guess 0 and 1.75! Also show the output in the form of a data frame/table iteration calculation!
- b. $f(x) = (x-3)(x-1)(x-1) \rightarrow$ double root, use an initial guess of 0.5 and 2.75! Also show the output in the form of a data frame/table iteration calculation!

The verification of Midterm 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-July-2020	