BT2101 Problem-set 1: Confidence intervals

Problem 1: Review Questions on Statistics

Let x be the random variable denoting the number of times to get number "1" when a dice is tossed twice. Draw a probability distribution table P(X).

Problem 2: Review Questions on Statistics

Given that student, "A" got a score below in phases 1 and 2 (see Table below). Can we say that she is doing better in phase 2? Assuming that all scores are normally distributed.

Phase	Student A score	Class Average Score	Class Standard Deviation
1	80	70	10
2	75	60	5

Problem 3: Use Python to solve the problem1

Through market research, NUSGum learns that the average gum thickness is 2.1 mm, and this thickness offers the best experience to customers. They are evaluating the quality of their gum thickness to produce gum at this thickness. Manufacturer produces 10 test pieces with thickness [2.3,2.4,3.1,2.2,1.0,2.3,2.1,1.1, 1.2,0.9,1.5,1.1]. In 95% confidence interval, test the validity and make a judgment that the average gum thickness is 2.1 mm.

Problem 4: Use Python to solve the problem2

We are using AUDIT data (from Wooldridge) and are interested in race discrimination. The variable Y is the difference in hiring rates between African-Americans and Caucasians (African-American hiring rate – Caucasians rate) with identical CV. Given that the U.S government said the average difference in hiring rates between African-Americans and Caucasians is around 20%. Using AUDIT data, make a decision that this media coverage is reliable (in 99% CI level).