IT2120 - Probability and Statistics

Lab Sheet 06

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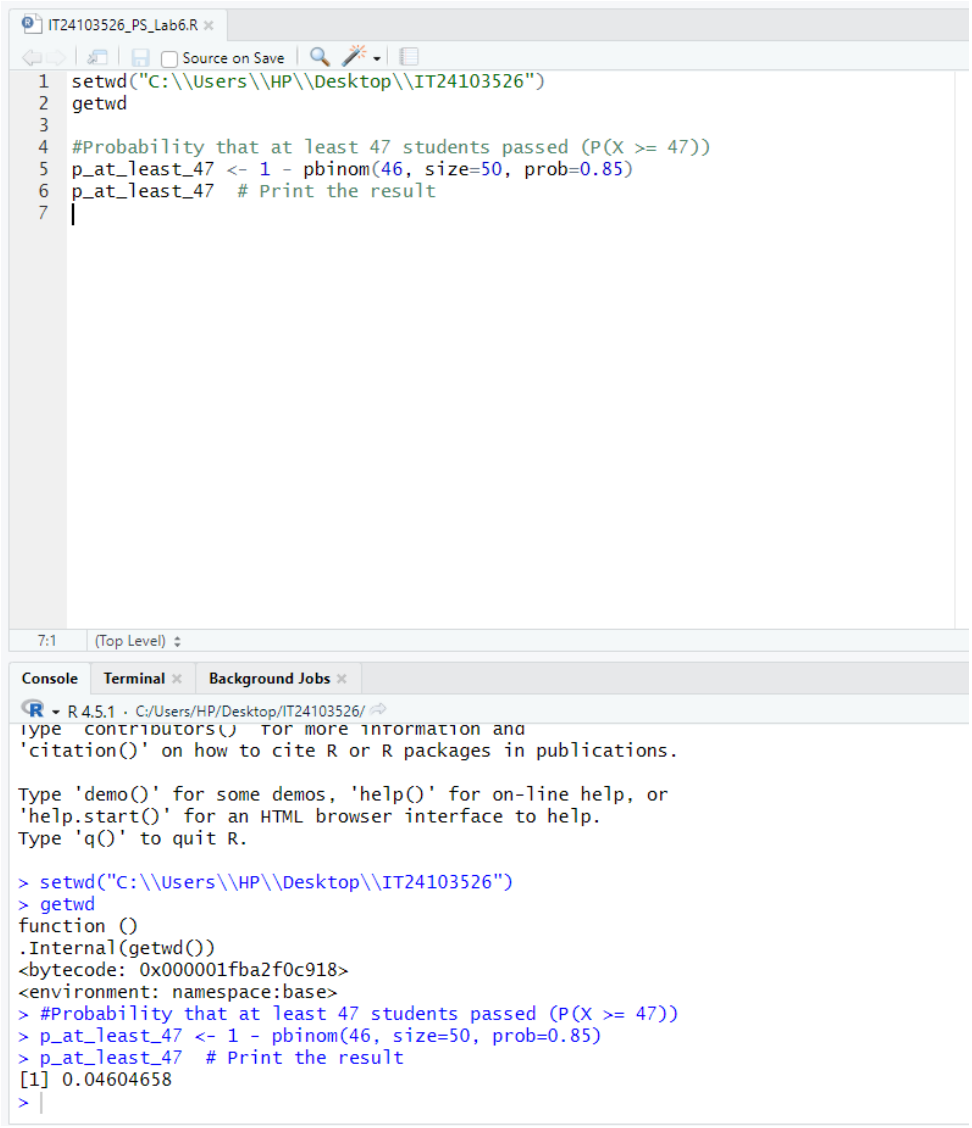
Exercise

1. An IT company claims that their newly developed learning platform improves student performance in online tests. According to previous data, 85% of students who used the platform passed their online tests. A batch of 50 students is selected at random who have completed the course using this platform. Let X denote the number of students who passed the test out of 50 students.

    i. What is the distribution of X?

X follows a Binomial distribution with parameters n=50 (number of trials/students) and p=0.85 (probability of success/passing on each trial). This is appropriate because each student independently passes or fails with constant probability, and we're counting the number of successes in a fixed number of trials.

ii. What is the probability that at least 47 students passed the test?



2. A call center receives an average of 12 customer calls per hour.

i. What is the random variable (X) for the problem?

X is the number of customer calls received in an hour.

ii. What is the distribution of X?

X follows a Poisson distribution with parameter λ=12 (average rate of calls per hour). This is suitable for modeling the number of rare events (calls) occurring in a fixed interval (one hour), assuming calls arrive independently and at a constant average rate.

iii. What is the probability that exactly 15 calls are received in an hour?