

Distribution Identification – Assignment Key

This assignment involves identifying the correct distribution for each real-world scenario. Below is the filled table with **explanations** for each choice.

✓ 1. Intrusion detection over 100 trials

“Evaluate the system’s accuracy over 100 distinct activities.”

- **Key clue:** Fixed number of trials ($n = 100$), probability of success known.
- **Distribution: Binomial**

✓ **Answer: Binomial**

✓ 2. Requests per minute to a server

“On average receives 300 requests per minute... distribution of requests over a minute.”

- **Key clue:** Counting number of events in a fixed interval of time.
- **Distribution: Poisson**

✓ **Answer: Poisson**

✓ 3. Developer testing until first success

“Interested in the probability of the number of runs until the first successful pass.”

- **Key clue:** Waiting for **first** success in repeated independent trials.
- **Distribution: Geometric**

✓ **Answer: Geometric**

✓ 4. Time between server failures

"Assuming the time between failures is memoryless."

- **Key clue:** Time between events with memoryless property.
- **Distribution: Exponential**

✓ **Answer: Exponential**

✓ 5. Selecting buggy files without replacement

"Selecting from a repository without replacement."

- **Key clue:** Sampling **without replacement** from a finite population.
- **Distribution: Hypergeometric**

✓ **Answer: Hypergeometric**

✓ 6. At least 5 successes in trials with known success probability

"Predict a specific event at least 5 times. Each prediction attempt has a known probability."

- **Key clue:** Counting number of trials until achieving a fixed number of successes.
- **Distribution: Negative Binomial**

✓ **Answer: Negative Binomial**

✓ Final Matching Summary:

Scenario Description	Answer
Intrusion detection over 100 activities	Binomial

Scenario Description	Answer
Server traffic (requests per minute)	Poisson
Developer testing until first success	Geometric
Time between server failures	Exponential
Selecting buggy files from a fixed set	Hypergeometric
Model must get at least 5 successes in trials	Negative Binomial