



## MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Bookmarks

- ▶ Unit 0: Overview
- ▶ Entrance Survey
- ▶ Unit 1: Probability models and axioms
- ▶ Unit 2: Conditioning and independence
- ▶ Unit 3: Counting
- ▶ Unit 4: Discrete random variables
- ▶ Exam 1
- ▶ Unit 5: Continuous random variables

Unit 9: Bernoulli and Poisson processes &gt; Lec. 21: The Bernoulli process &gt; Lec 21 The Bernoulli process vertical1

Bookmark

## Exercise: Time until the first failure

(1/1 point)

Let the sequence  $X_n, n = 1, 2, 3, \dots$ , be a Bernoulli process with parameter  $\mathbf{P}(X_n = 1) = p$  for all  $n \geq 1$ . Let  $U$  be the time when a value of  $\mathbf{0}$  is first observed:  $U = \min\{n : X_n = 0\}$  Then, the random variable  $U$  is:

Geometric with parameter  $p$ Geometric with parameter  $\mathbf{1} - p$  ✓

None of the above


Answer:

For  $n \geq 1$ , the event  $\{U = n\}$  corresponds to  $n - 1$  1's followed by a 0. Its probability is  $p^{n-1}(1 - p)$ , which corresponds to a geometric PMF with parameter  $\mathbf{1} - p$ .


- ▶ Unit 6: Further topics on random variables
- ▶ Unit 7: Bayesian inference
- ▶ Exam 2
- ▶ Unit 8: Limit theorems and classical statistics
- ▼ **Unit 9: Bernoulli and Poisson processes**

#### Unit overview

##### **Lec. 21: The Bernoulli process**


Exercises 21 due May 11, 2016 at 23:59 UTC 

##### **Lec. 22: The Poisson process**

Exercises 22 due May 11, 2016 at 23:59 UTC 

##### **Lec. 23: More on the Poisson process**


*You have used 1 of 1 submissions*

Exercises 23 due May 11, 2016  
at 23:59 UTC 

**Solved problems**

**Additional theoretical  
material**

**Problem Set 9**

Problem Set 9 due May 11,  
2016 at 23:59 UTC 

**Unit summary**

► Unit 10: Markov  
chains

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