



Bookmarks



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2.1 Link Layer

Week 1 Quiz due Jan 25, 2016 at 15:30 UTC

2.2 Multiple Access Protocols

Week 1 Quiz due Jan 25, 2016 at 15:30 UTC

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2.4 Efficiency of Slotted Aloha

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2.5 Lab 1: Link Layer

Lab due Jan 25, 2016 at 15:30 UTC

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Topic 2: The Link Layer > 2.5 Lab 1: Link Layer > LAB 1 - OVERVIEW

OVERVIEW

In this lab, we will study the slotted ALOHA multiple access scheme. For that purpose, we will first learn how to create and check the correctness of a frame, and then observe the throughput performance of the ALOHA protocol both by simulation and analytically. In particular, you will complete four tasks:

1. Task 1 provides an overview of the slotted ALOHA system with a given number of users that transmit data frames in each slot with probability p . In this task, you will find the efficiency of the system.
2. In task 2, you will create the frame that is used at the link level to send the datagram.
3. In task 3, you will check the correctness of received frame using the checksum bits in the frame structure.
4. In task 4, you will evaluate the performance of the ALOHA system. In particular, you will plot the efficiency of the system as a function of the transmission probability p both by simulation and analytically.

For the lab exercise, you will see a new interface. There are three elements:

1. **"Instructions"** - States the objective of this exercise and explains the task you should complete.
2. **"Your Solution"** - Input your solution into this window (previously, called the "code window"). Note that now the "Your Solution" window occurs below the instructions.
3. **"Assessment Tests"** (new feature) - Lists the tests that the grader will perform on your submissions. After you submit your solutions, you will see feedback here regarding whether your solutions passes all or only some of the tests. For the failed tests, there will be error messages indicating what you should revise to pass the grader and earn the credits.

Attention: You will have unlimited number of "submission attempts" before the deadline. The last submission before the deadline is the only one to count towards your score.

1

INSTRUCTIONS

ALOHA protocol controls the access of different nodes to the shared channel by asking the nodes to transmit/retransmit their data frames with certain probability. As a result, there is certain chance that only one of the nodes will use the channel, thus avoiding collision and enabling a successful transmission. Given the multiple access is controlled by the random transmission of the nodes, we call it the random access scheme. The MATLAB code in the below window shows the functioning of the slotted ALOHA system by simulating four nodes (**n_users**), each of which is identified by the index **id**, that transmit data frames with probability $p=0.1$. In this simulation, we assume the nodes are always in the backlog mode, i.e. nodes always have data to transmit.

```
%% %% Revise the following code %% %%
```

and

```
%% %% Do not change the code below %% %%
```

Do not change other parts of the code.

2

Your Solution

Save

Reset

MATLAB Documentation

```
1 rng(0)
2
3 % parameters
4 n_slots = 1000; %
5 p=0.1;
6 n_users = 4;
7
8
```

Run

Submit for Assessment

3

Assessment Tests

Is problem setup unmodified?

Is the efficiency correct?

New Features

Allows you to save any progress for return later. Progress is automatically save when you press "Submit for Assessment."

Resets the code box. Unlike previous version, the button always works. So, you can reset the code anytime you want.

Links to MathWorks documentation where you can search for help.

Your Solution

```
1 rng(0)
2
3 % parameters
4 n_slots = 1000; %
5 p=0.1;
6 n_users = 4;
7
8
```

Save

Reset

MATLAB Documentation

Run

Submit for Assessment

Executes your code, but does not execute the assessment test. You can view the output of your code along with any figures. Results of your code are shown right below the code box.

Executes your code and the assessment tests. Results are of assessment test are shown right below the code box with output from your code shown below assessment results.



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