







[Network Theory and Dynamic Systems \(S...](#)

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Network Theory and Dynami

Course Team

BigBlueButton: NTDS

Module Overview

Books and Other Resources

Lecture Material

Assignments

Assignment 01: Introducti

Assignment 02: Network El

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Assignment 04: Hubs

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Assignment 06: Graph-base

Assignment 07-08: Network

Assignment 09: Dynamics I

Assignment 10: Dynamics I

Exam Eligibility Assignme

Demo Exam Paper

Forum

## Assignment 09: Dynamics I



### Performance summary

Assessed

Success status



Undefined

Score

0 of 100 points



Attempts

1

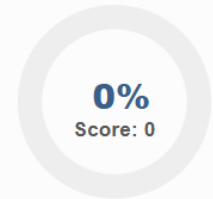


### Results

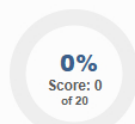
Course	Network Theory and Dynamic Systems (SS 2025) ID: 4669112833 / 109995544223065
Test	Assignment 09: Dynamics I ID: 4611145836

### This are your test results

Duration	0h 0m 6s 6/6/2025, 1:42 PM -
Answered	0 of 5 questions (0%)
Your score	0 of 100 points (0%)



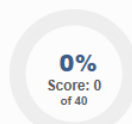
1. Knowledge Tasks (20 points) 1



go to section >



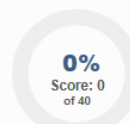
2. Practical Tasks (40 points) 2



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3. Practical Tasks (40 points) 2



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### 1. Knowledge Tasks (20 points) 0 of 20 points (0%)

#### Dynamics Simulation and Node Selection (20 points)

Status Seen but not answered

Your score 0 / 20 0%

#### Response

When we simulate a dynamic process on a network, there are several ways to asynchronously pick the next node(s) to update. Typically, nodes are selected in random sequence. Another strategy would be to select one endpoint of a randomly selected link. Do you think that this would affect the dynamics in any way? Why or why not?

0 word

Solution

## 2. Practical Tasks (40 points) 0 of 40 points (0%)

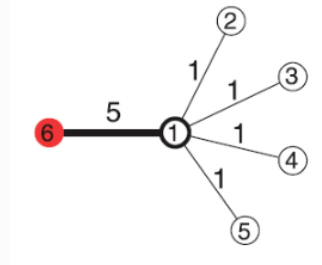
### Linear Threshold Model (20 points)

Status Seen but not answered

Your score 0 / 20 0%

#### Response

Consider the following network, where node 6 is initially activated:



1. According to the linear threshold model, will node 1 be activated if its threshold is 4?
2. What if it is 5?
3. Do the answers to these questions change if we vary the weights of the links joining node 1 to its inactive neighbors (2,3,4,5)?

0 word

► Solution

### Independent Cascade Model (20 points)

Status Seen but not answered

Your score 0 / 20 0%

#### Response

You are considering the independent cascade model on a network. Two active nodes  $s$  and  $t$  have degree 4 and 10, respectively. They can convince their neighbors with probability  $1/2$  ( $s$ ) and  $1/5$  ( $t$ ). Which node will influence more neighbors on average,  $s$  or  $t$ ?

0 word

► Solution

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## 3. Practical Tasks (40 points) 0 of 40 points (0%)

### SIR Mode (40 points)

Status Seen but not answered

Your score 0 / 40 0%

#### Response

Simulate the SIR dynamics on a random network with  $N=1000$  nodes and link probability  $p=0.01$ . Initially 10 nodes are infected, chosen at random. The probability of recovery is  $\mu=0.5$ . Run the dynamics for these values of the infection probability:  $\beta=0.02, 0.05, 0.1, 0.2$ .

- In each run, save the number of simultaneously infected people after each iteration and calculate the maximum value. Interpret the results.
- How many iterations are needed to reach the maximum?
- Do you observe a major outbreak? Why or why not?

Hint: Feel free to modify the code of [tutorial 7](#) to run the simulations.

Solution

Upload file

Status	Seen but not answered	
Your score	0 / 0	<div></div> 0%

Response

Upload code here.

File

No file uploaded

Solution

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## Test execution

Information

Availability: Expired at 6/17/2025, 11:59 PM

Max. attempts: Unlimited

Results of this test are visible to administrators and tutors of this course.

Start test

Change log

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