



UNIVERSITÀ  
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# Analisi e Visualizzazione delle Reti Complesse

## NS05 - Complex Network Analysis - Solutions

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## Exercise 1

(1) Road segments, e.g., 5th Ave. between 12th and 13th streets

## Exercise 2

b. Street intersections, e.g., 5th Ave. and 12th St.

## Exercise 3

An edge could represent the presence of flight(s) between the two airports.

## Exercise 4

(1) Hub nodes with many links



## Exercise 5

Undirected

## Exercise 6

Directed

## Exercise 7

(4) A link connects two nodes. A node can be connected to at most  $N - 1$  other nodes.

## Exercise 8

(3) Total in-degree must be equal to total out-degree



## Exercise 9

(1) Directed, weighted

## Exercise 10

(3) Network  $A$  has more links than network  $B$

## Exercise 11

(2) Directed, weighted

## Exercise 12

(3) C



### **Exercise 13**

(2)  $N = 6, L = 10$

### **Exercise 14**

(1) True

### **Exercise 15**

(4) It has increased or stayed the same

### **Exercise 16**

(3) Weakly connected

## **Exercise 17**

(4) 10

## **Exercise 18**

(2) Social networks have small average path length

## **Exercise 19**

(3) Social networks are highly clustered, yet are not dense.

## **Exercise 21**

disassortative

## Exercise 22

(a,e)

## Exercise 23

AEC form a triangle by belonging to different groups; they connect different communities that otherwise would be disconnected

## Exercise 24

There are at least 4 foci because there are 4 different triangles.

## Exercise 25

weak (otherwise for the theory of weak-string ties, there should also be other links like e-c)