Chair of Mobile Business & Multilateral Security

Mentorium
Business Informatics 2 (PWIN)

Information Systems III & Communication Systems I
SS 2011

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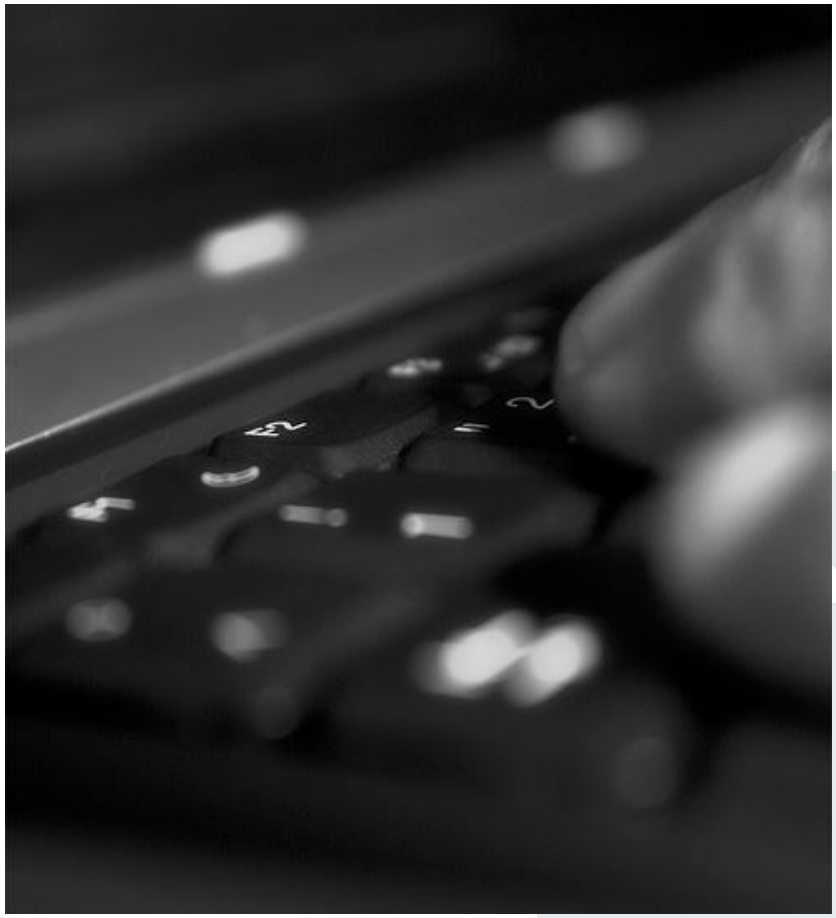
www.m-chair.net



Jenser (Flickr.com)

Mobile Voice & Data Communication Services

- Which Mobile Voice & Data Communication services are required for the myPlace service?

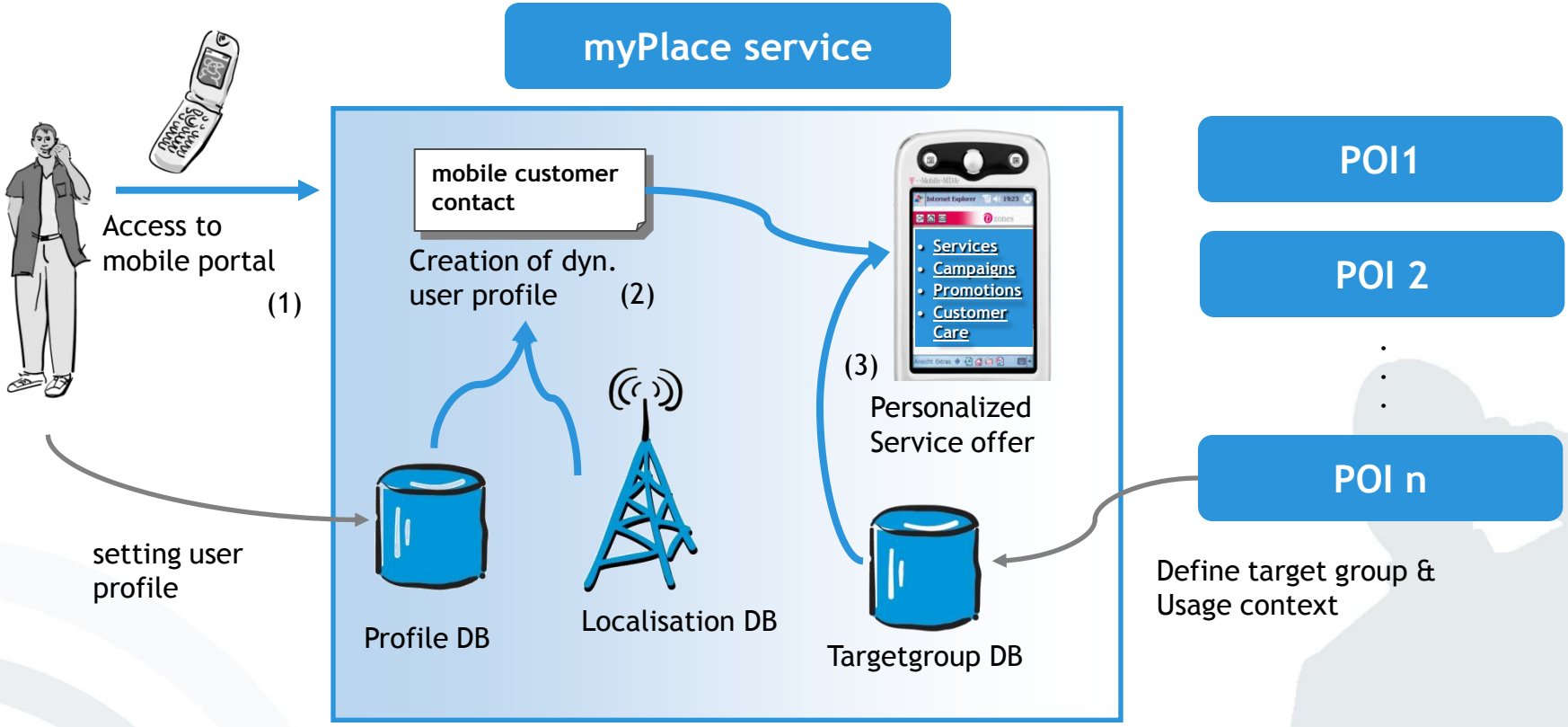
- Which additional mobile services can provide “added value” to its users?

Mobile Voice & Data Communication Services

Fundamental Mobile Communication Services

- Mobile Voice
  - GSM, UMTS
- Mobile Data
  - GPRS, EDGE, 3G networks (UMTS, HSDPA), 4G networks (LTE, LTE Advanced)
- Mobile Messaging
  - Text Messaging (SMS), Multimedia Messaging (MMS)
- Mobile Machine-To-Machine
  - GPRS, EDGE, 3G networks (UMTS, HSDPA), 4G networks (LTE, LTE Advanced)

Process overview of the myPlace service



Mobile Phones Capabilities

- Describe the evolution of mobile phone capabilities over the course of time.
- Which basic capabilities are already required in the myPlace service and which could make sense to integrate?

Evolution of Mobile Phones Capabilities

Time

- Near Field Communication (NFC)
- Possibility to execute 3rd party software
- Multimedia applications (MP3, radio, camera, video, TV, etc.)
- Data Services (GPRS, UMTS, LTE Internet connectivity, Wi-Fi)
- Bluetooth
- Interactive Voice Response (IVR)
- Short Message Service (SMS)
- General telephony capabilities

Mobile Operating Systems

- What are the primary and secondary goals of a mobile operating system? Which functions do mobile OS have?

- Which OS function(s) are important for the myPlace service and why?

Mobile Operating System Objectives

What is a mobile operating system (OS)?

- An OS is a program that serves as a mediator between the user and the hardware.
- It enables the users to execute programs
- *Other properties:* Multi-user, multi-thread, high availability, real-time, …

- ***Primary goal of an OS***: Easy usage of the actual hardware
- ***Secondary goal of an OS***: Efficient usage of the hardware

Silberschatz (1999)

Functions of the Mobile Operating System

- Controlling of the resources:
  - Computation time, real-time processing:
    “Who is computing how much? How long does it take?”
  - Memory (RAM, Disk):
    “Who gets which part of the memory?”

- Security functions:
  - Protection of the data (memory, hard disk):
    “Who is allowed to access resources?”
  - Process protection (computation time, code, isolation):
    “Who is allowed to compute?”

- Communication:
  - Allocation of I/O-Resources
  - Processing of the communication
  - User interface (UI)

Mobile Applications

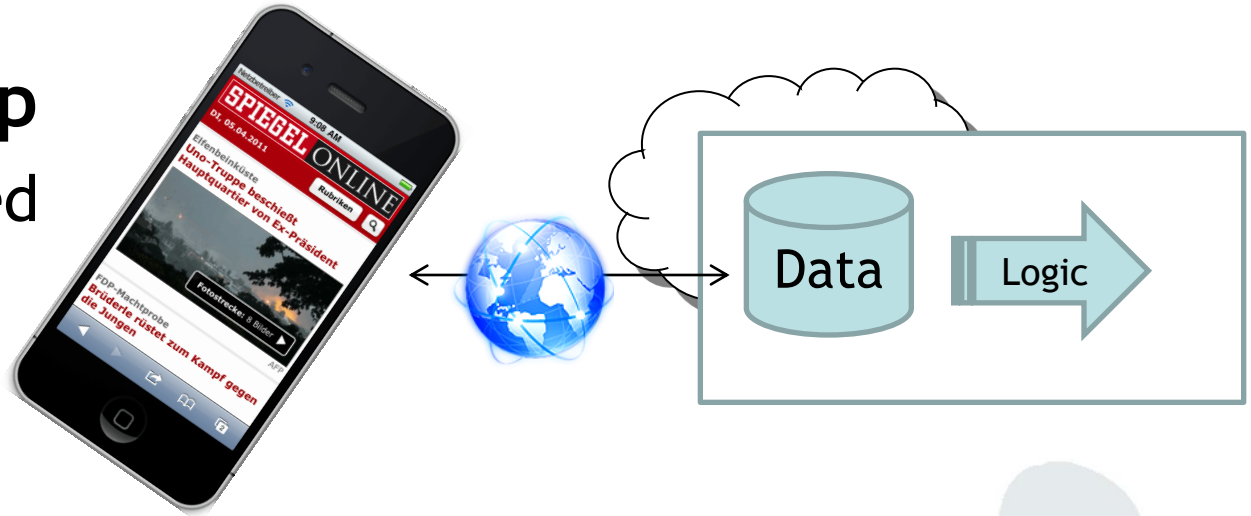
- Name and explain the two different types of mobile applications. Explain the main differences and summarise the advantages and disadvantages of the two application types.

- Based on the main differences, in which case/scenario do you recommend the myPlace service to be implemented as a Mobile App?

Types of Mobile Apps

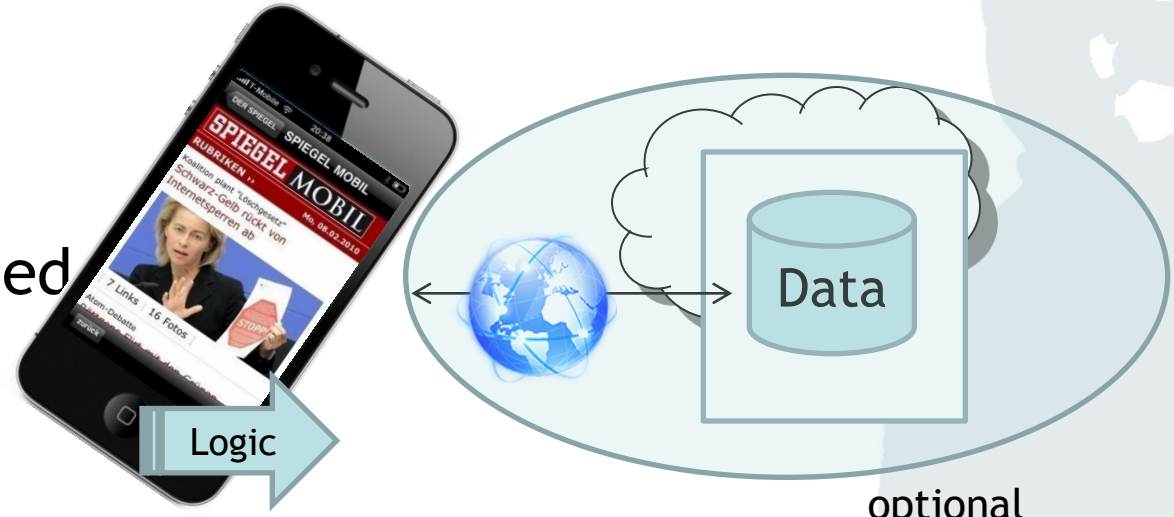
Mobile Web App

- App not installed on the device



Mobile App ("Native App")

- App is downloaded and installed



Mobile Web Apps vs. Mobile Apps

Mobile App ("Native App")	Mobile Web App
Supports offline use	Needs constant internet connectivity (network coverage)
Can be found easily in App Store(s)	Distribution via URL, e.g. QR-codes
Business Model: Sold in App Store(s)	Difficult to implement payment and authentication system
Can make use of all OS and device functions	Cannot access OS core functions (e.g. 3D graphic processing or access to local storage)
Needs to be platform-specific (native code)	Using web browser of the device, hence manufacturer-independent multi-platform support possible; also porting to other devices/platforms is less expensive
Based on Objective-C, C#.Net, Java	Based on HTML5, CSS, Javascript
Updates/Versioning through App Stores	Easy updates as they are done on the server, not on every client device

IPv6

- What is IPv6 and why do we need it? According to the ISO/OSI model, in which layer is the IP protocol?

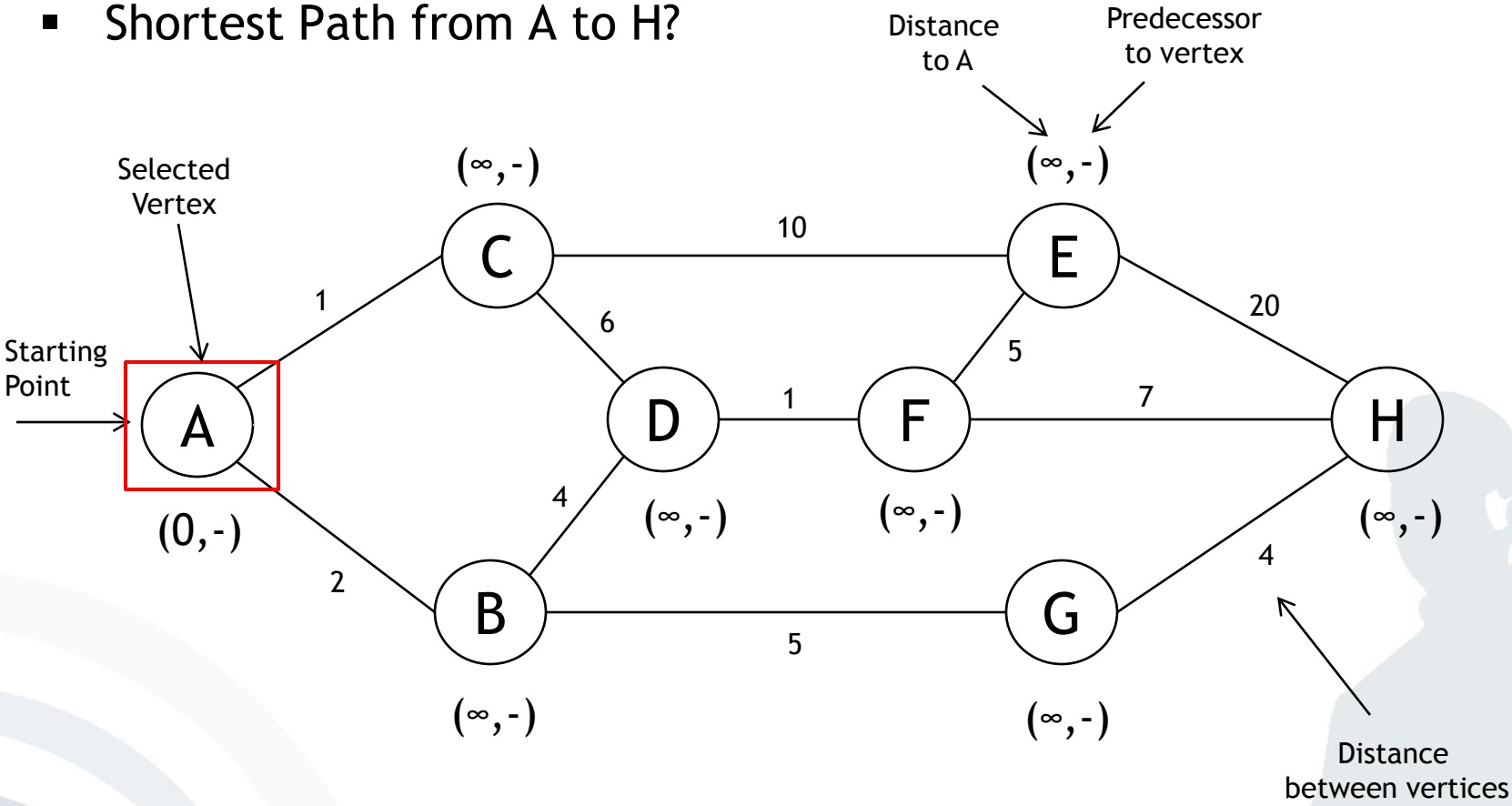
- Should myPlace integrate IPv6? If yes, which advantage does it provide? Why does IPv6 mean with regard to user privacy?

IPv6 Enhancements based on IPv4

- Enhancements in IPv6
  - An IPv6 address is consists of 128 bits (instead of 32-bit).
  - IPv6 addresses are not written in decimals (like e.g. 80.130.234.185), but in **eight groups of four hexadecimal digits**, separated by colons (e.g. 485A:B722:0DEF:3188:CE45:651A:2134:E0F0).
  - The new IPv6 address space supports 2^{128} addresses = 340,282,366,920,938,463,463,374,607,431,768,211,456
  - IPv6 provides enough addresses in order to permanently assign a unique address to any existing internet device – worldwide. What does this mean in terms of user privacy?

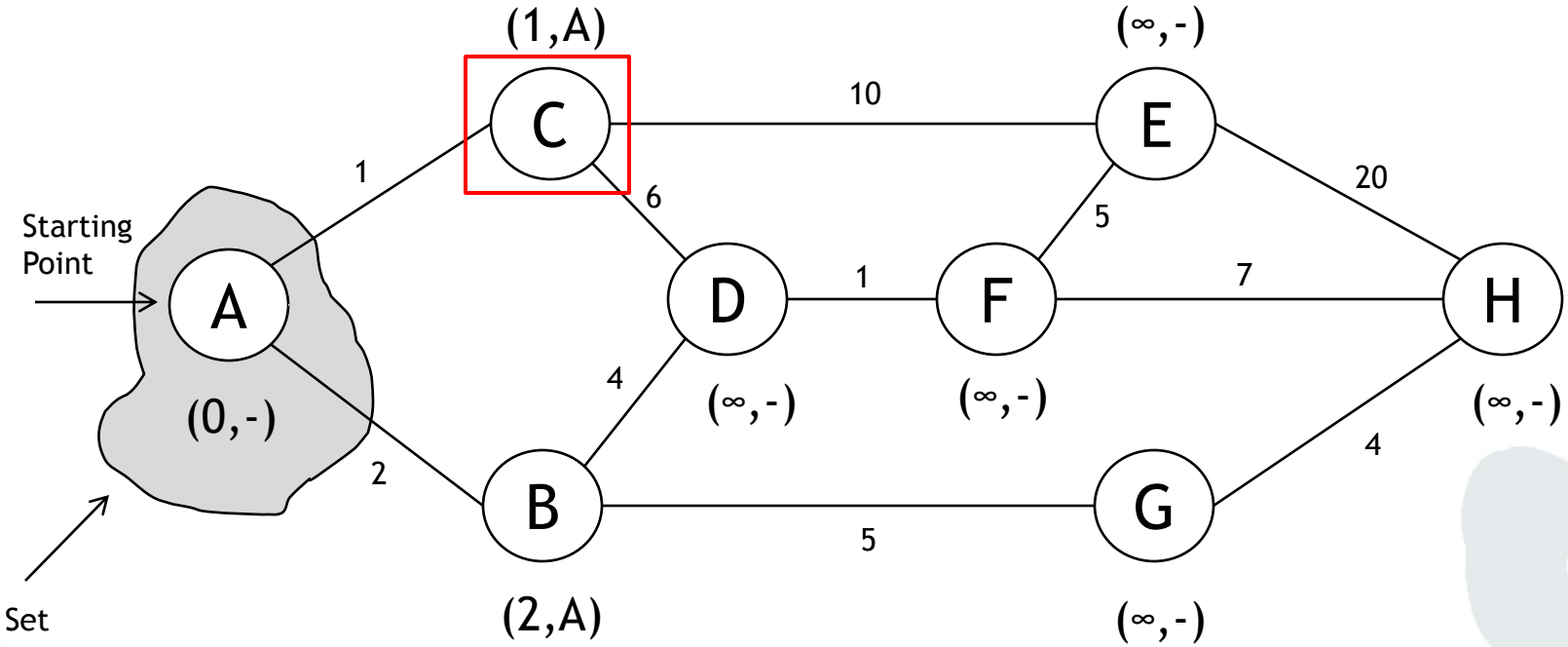
Using Dijkstra Algorithm

- Shortest Path from A to H?



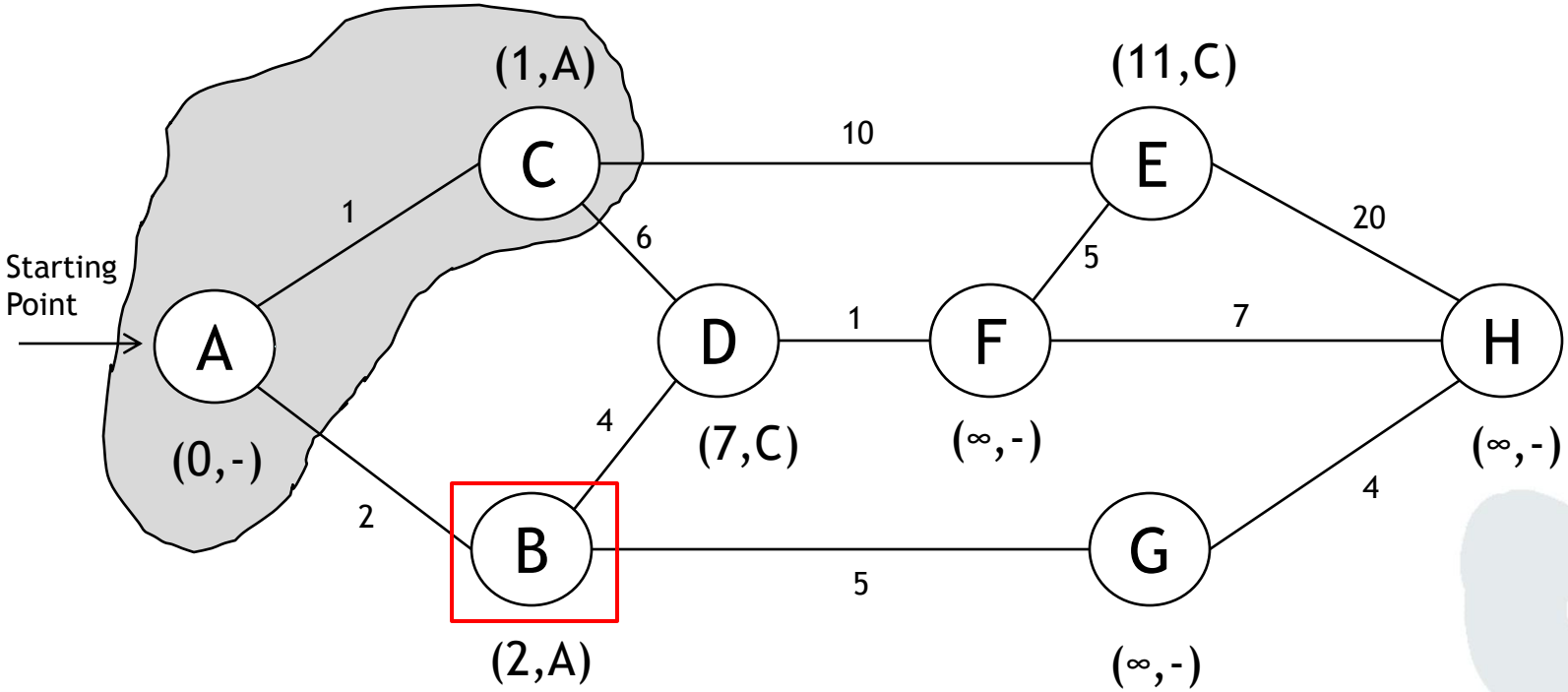
- Initial State of Graph

Using Dijkstra Algorithm (2)



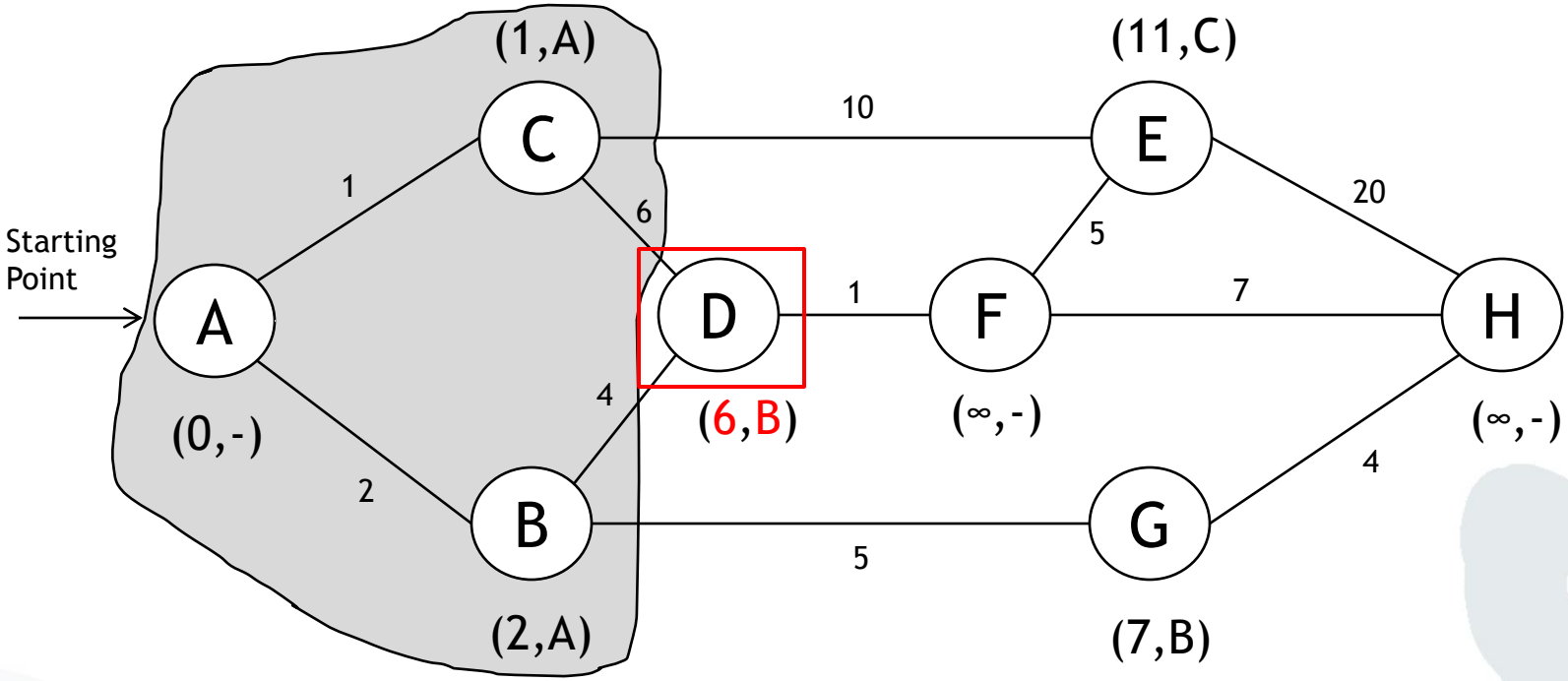
- Add last selected vertex to the set: A
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: B and C
- Select the vertex, which is not in the set and has the minimum value: C

Using Dijkstra Algorithm (3)



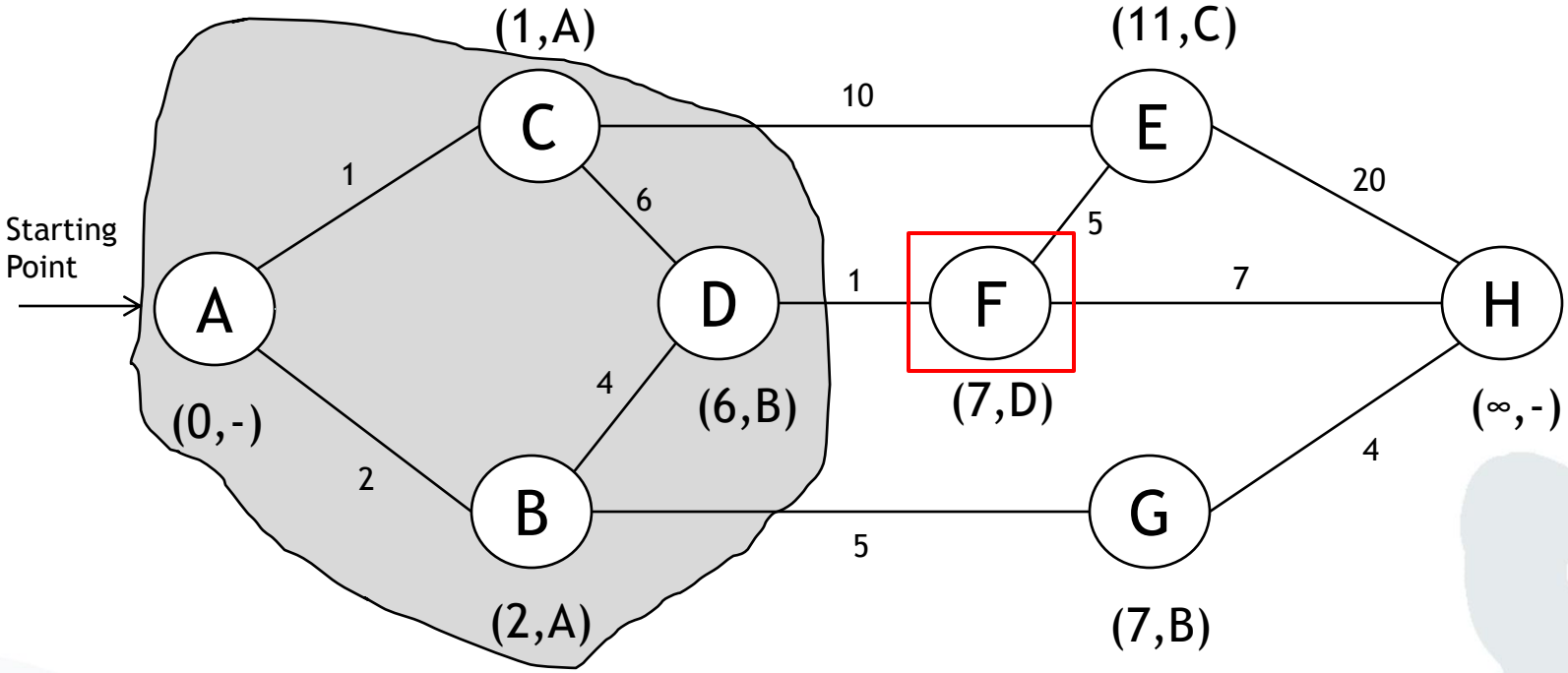
- Add last selected vertex to the set: C
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: D and E
- Select the vertex, which is not in the set and has the minimum value: B

Using Dijkstra Algorithm (4)



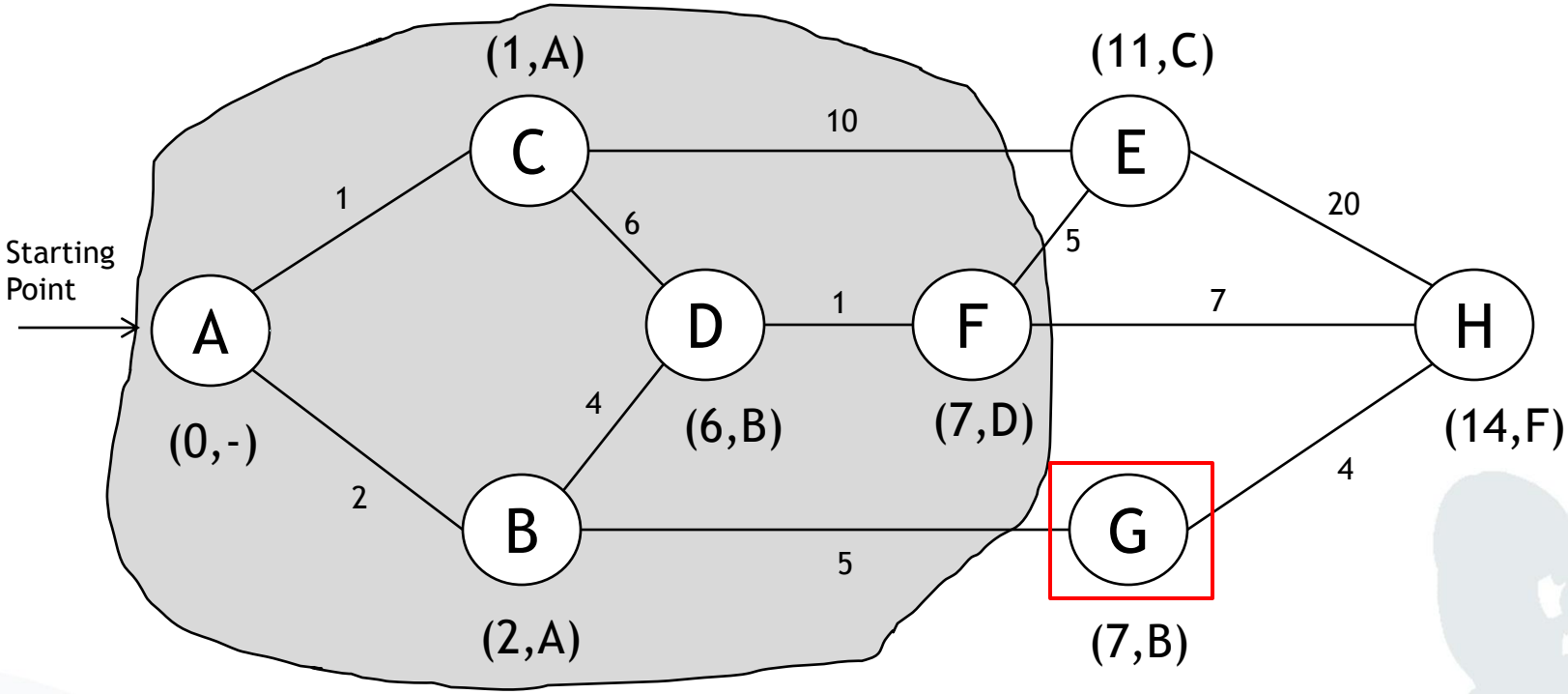
- Add last selected vertex to the set: B
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: D and G
- Select the vertex, which is not in the set and has the minimum value: B

Using Dijkstra Algorithm (5)



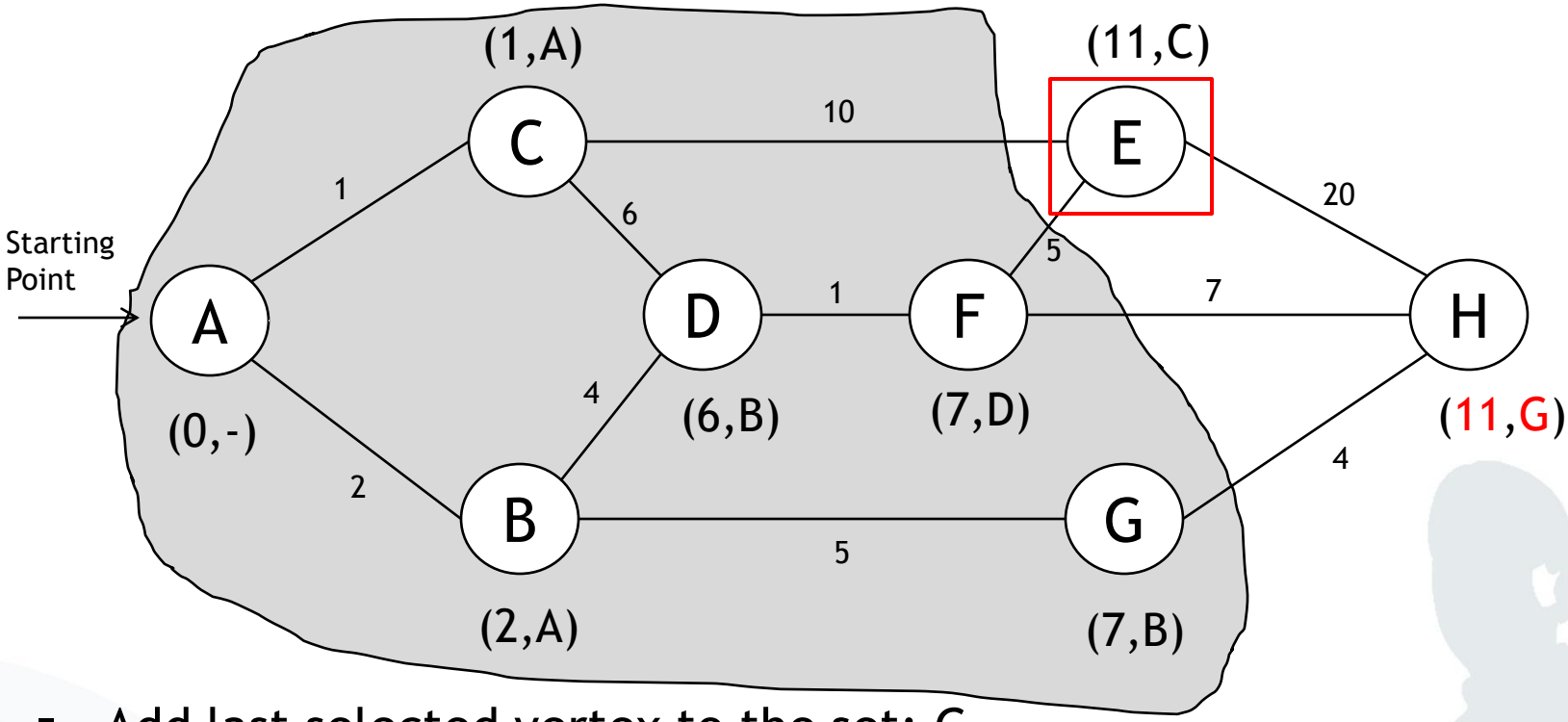
- Add last selected vertex to the set: D
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: F
- Select the vertex, which is not in the set and has the minimum value: F (if two minimum values exist, pick one randomly)

Using Dijkstra Algorithm (6)



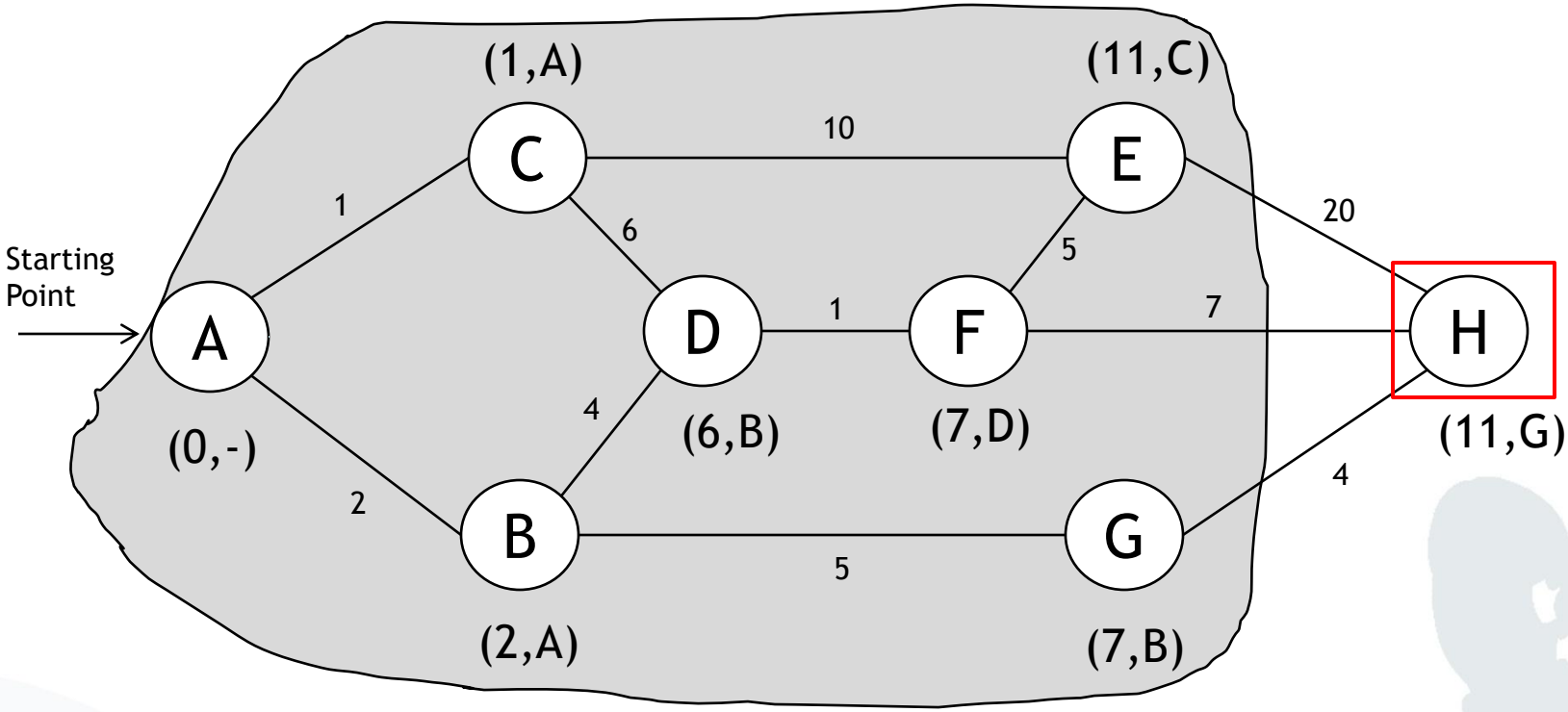
- Add last selected vertex to the set: F
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: E and H
- Select the vertex, which is not in the set and has the minimum value: G

Using Dijkstra Algorithm (7)



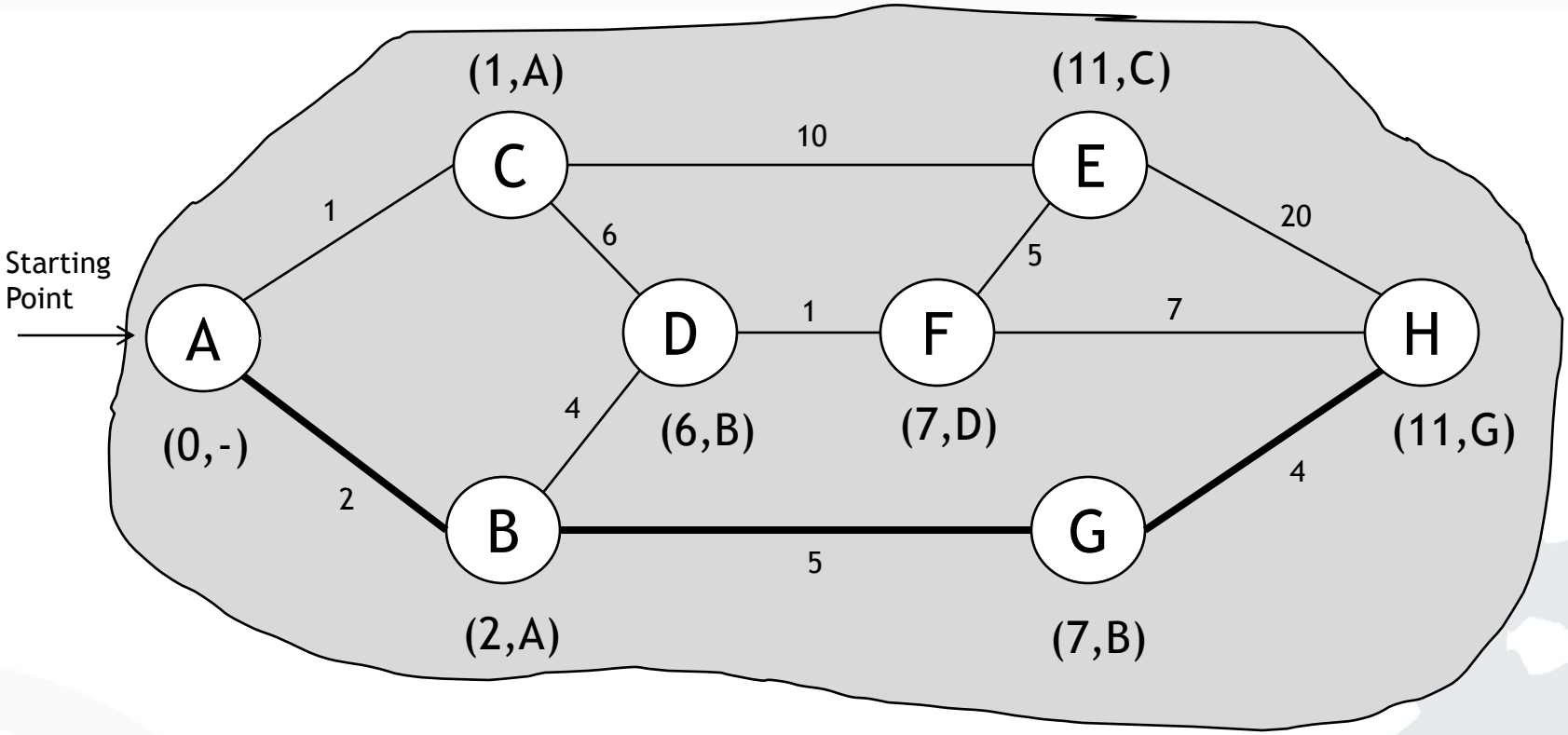
- Add last selected vertex to the set: G
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: H
- Select the vertex, which is not in the set and has the minimum value: E (if two minimum values exist, pick one randomly)

Using Dijkstra Algorithm (8)



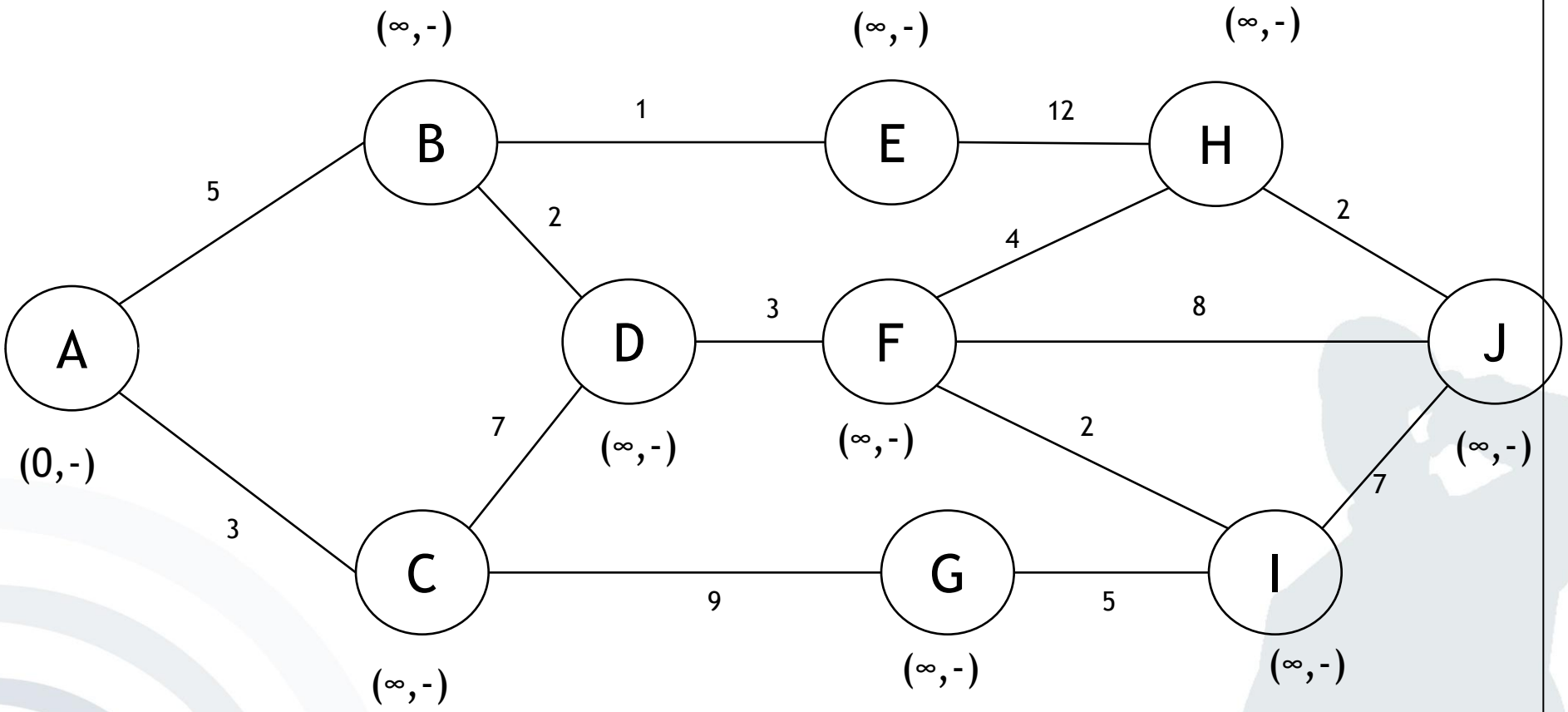
- Add last selected vertex to the set: E
- If shorter, update distance and predecessor values of the neighbours of the last selected vertex: H
- Select the vertex, which is not in the set and has the minimum value: H

Using Dijkstra Algorithm (9)



- Add last selected vertex to the set: H
- Predecessor labels allow to find the shortest path (A,B,G,H) → 11

Dijkstra Algorithm (1)



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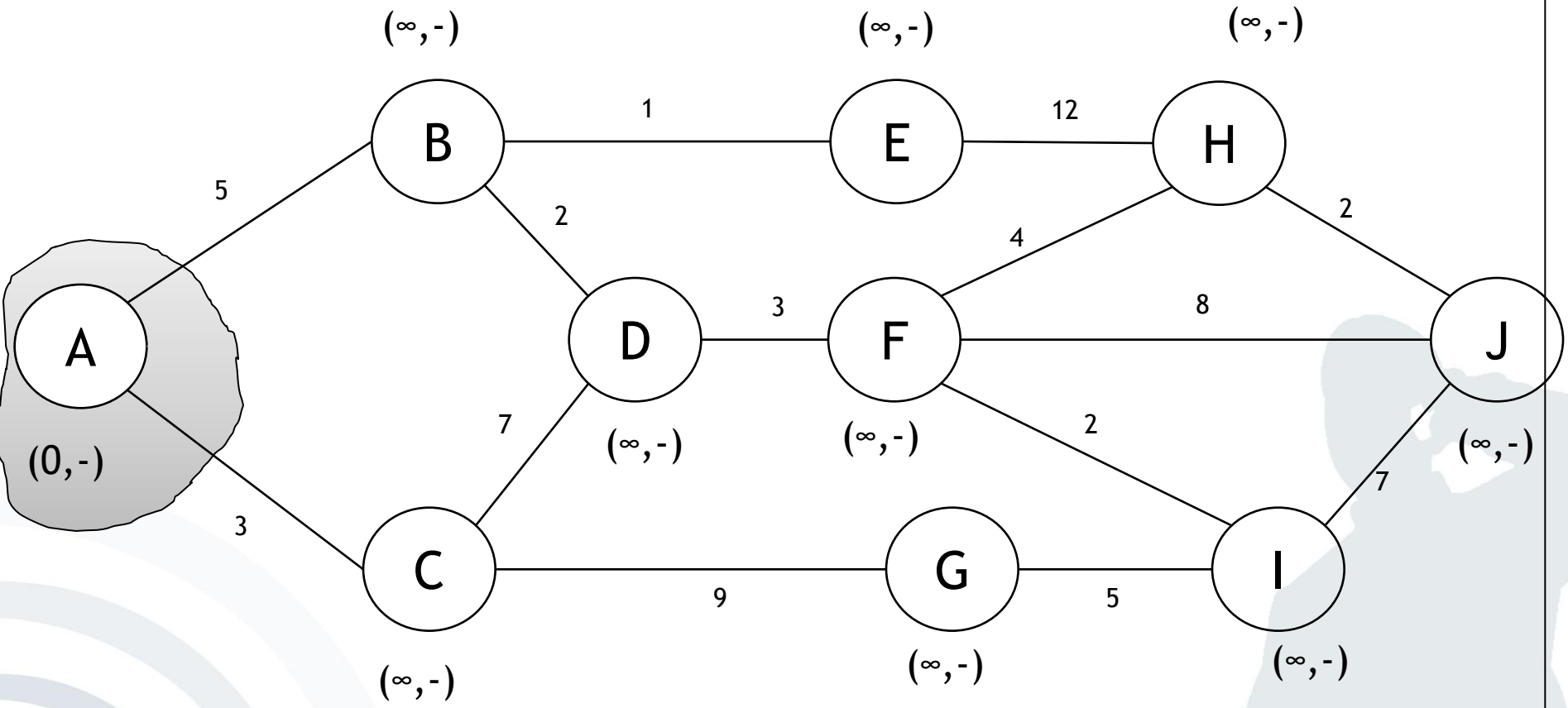

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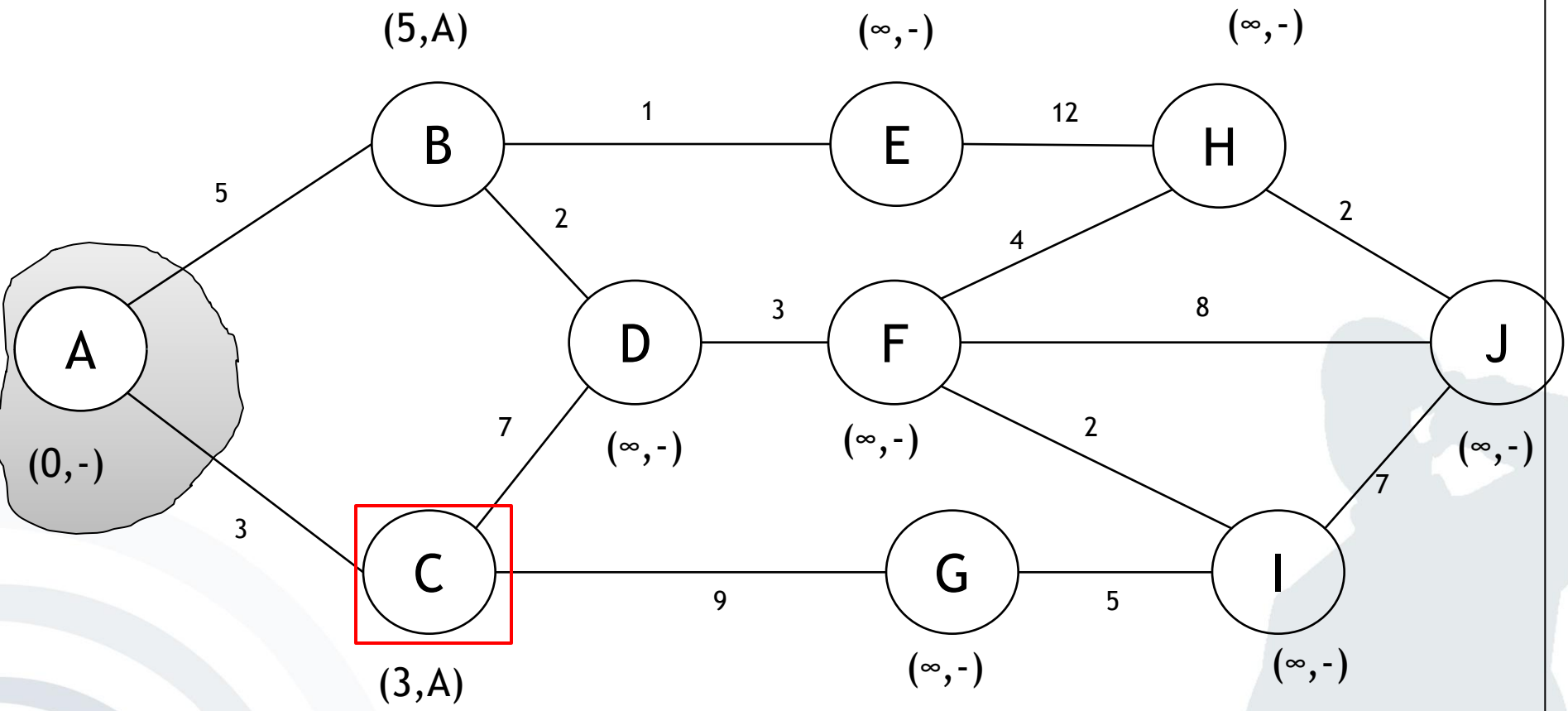

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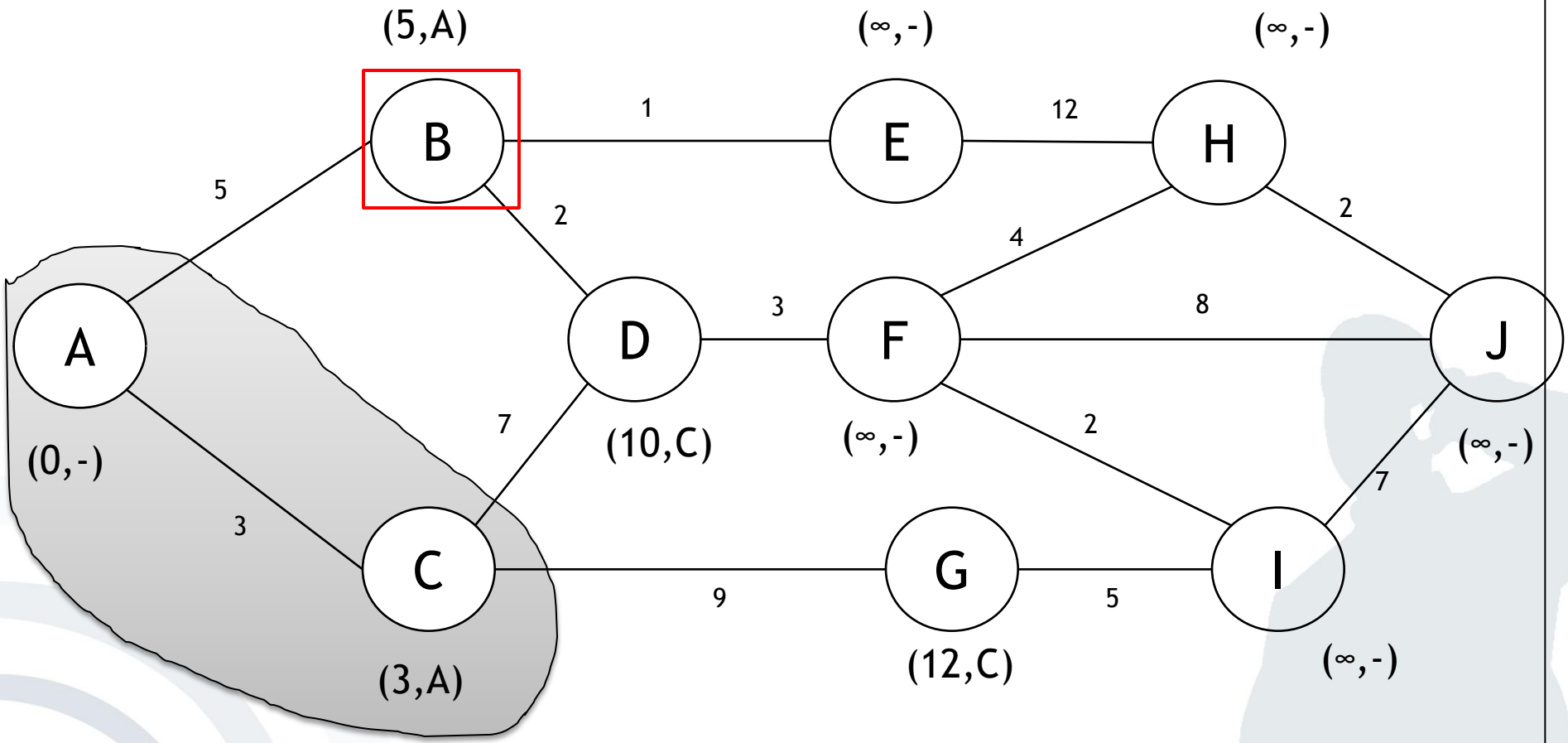

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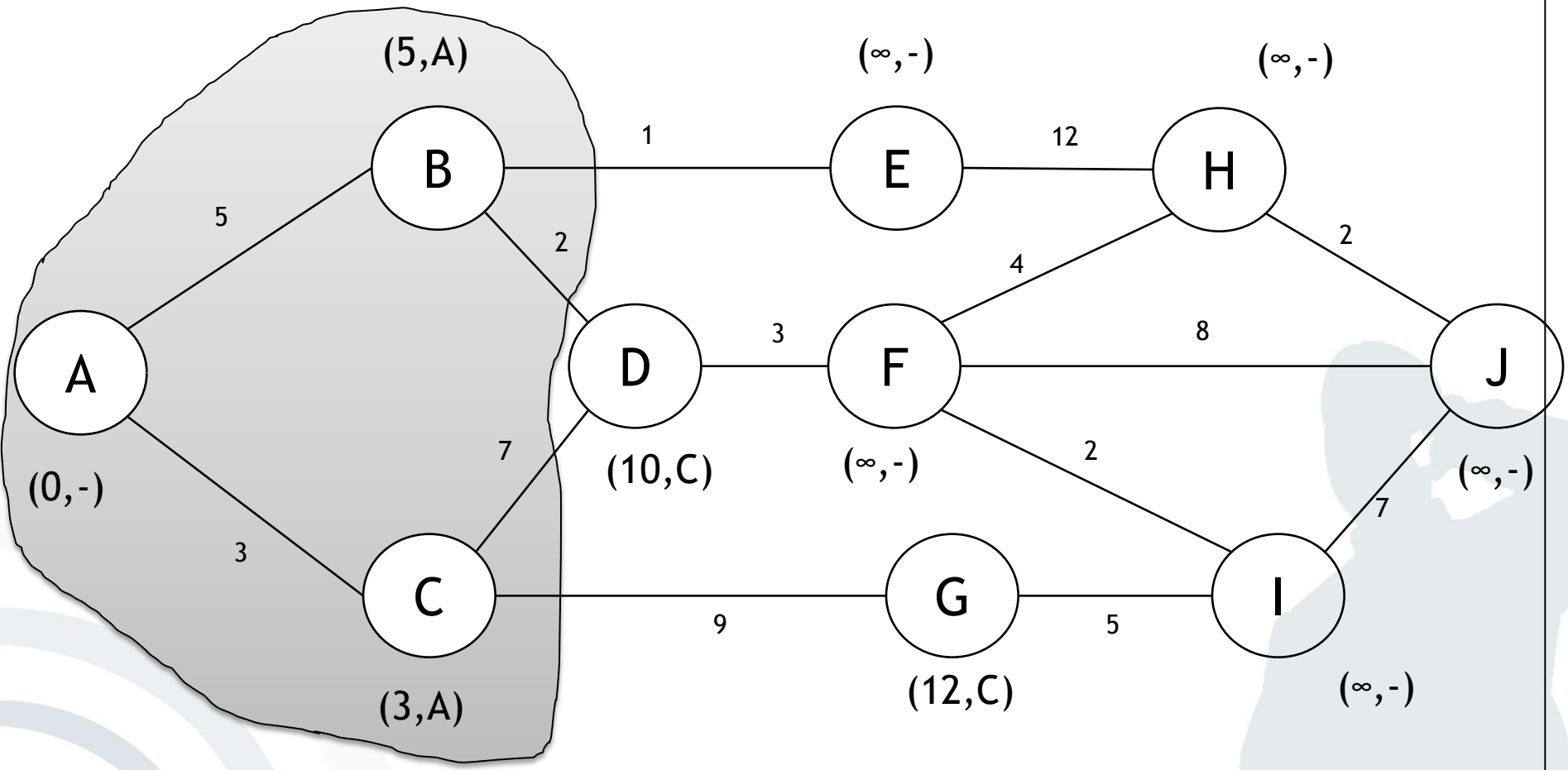

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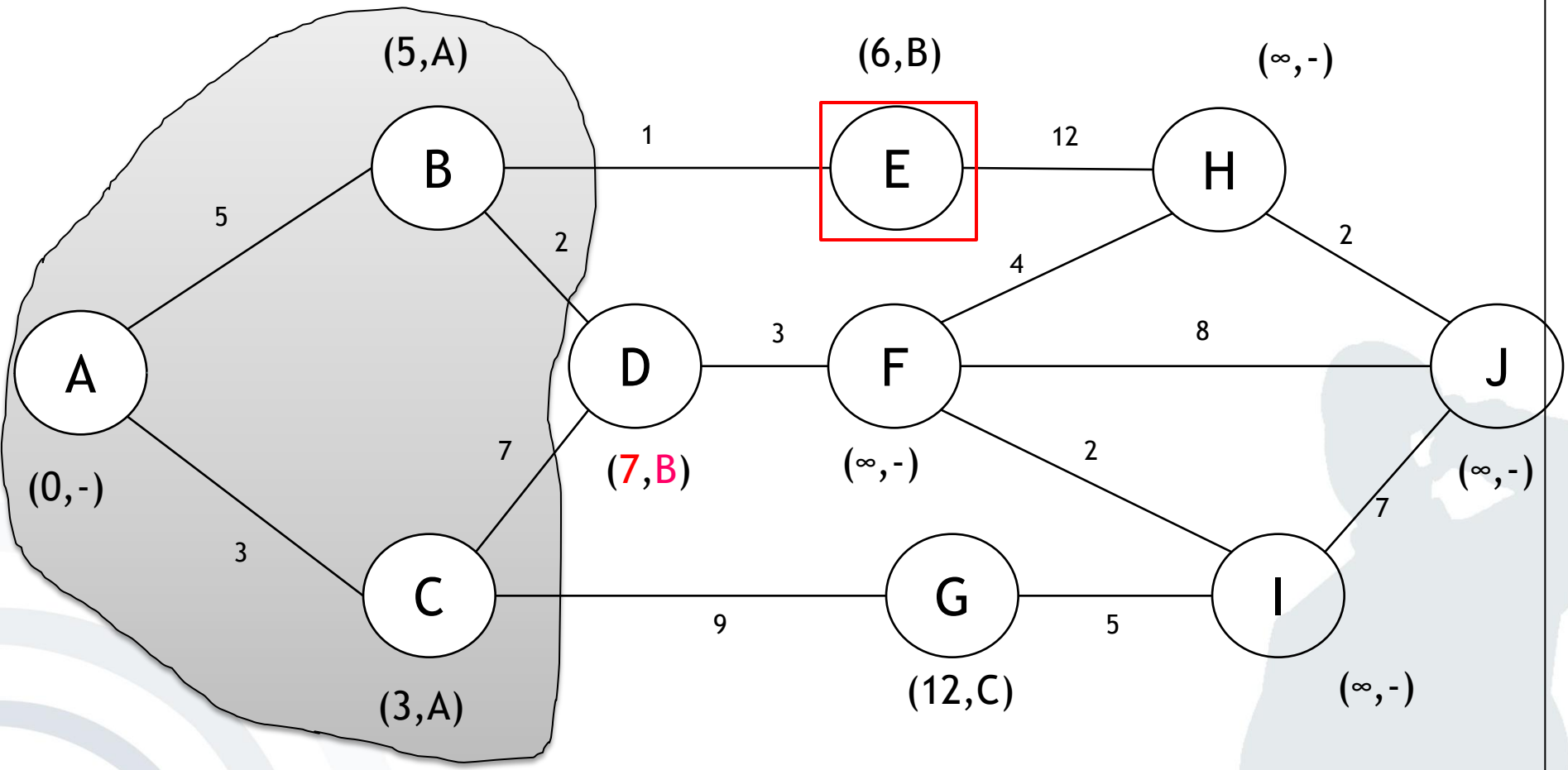

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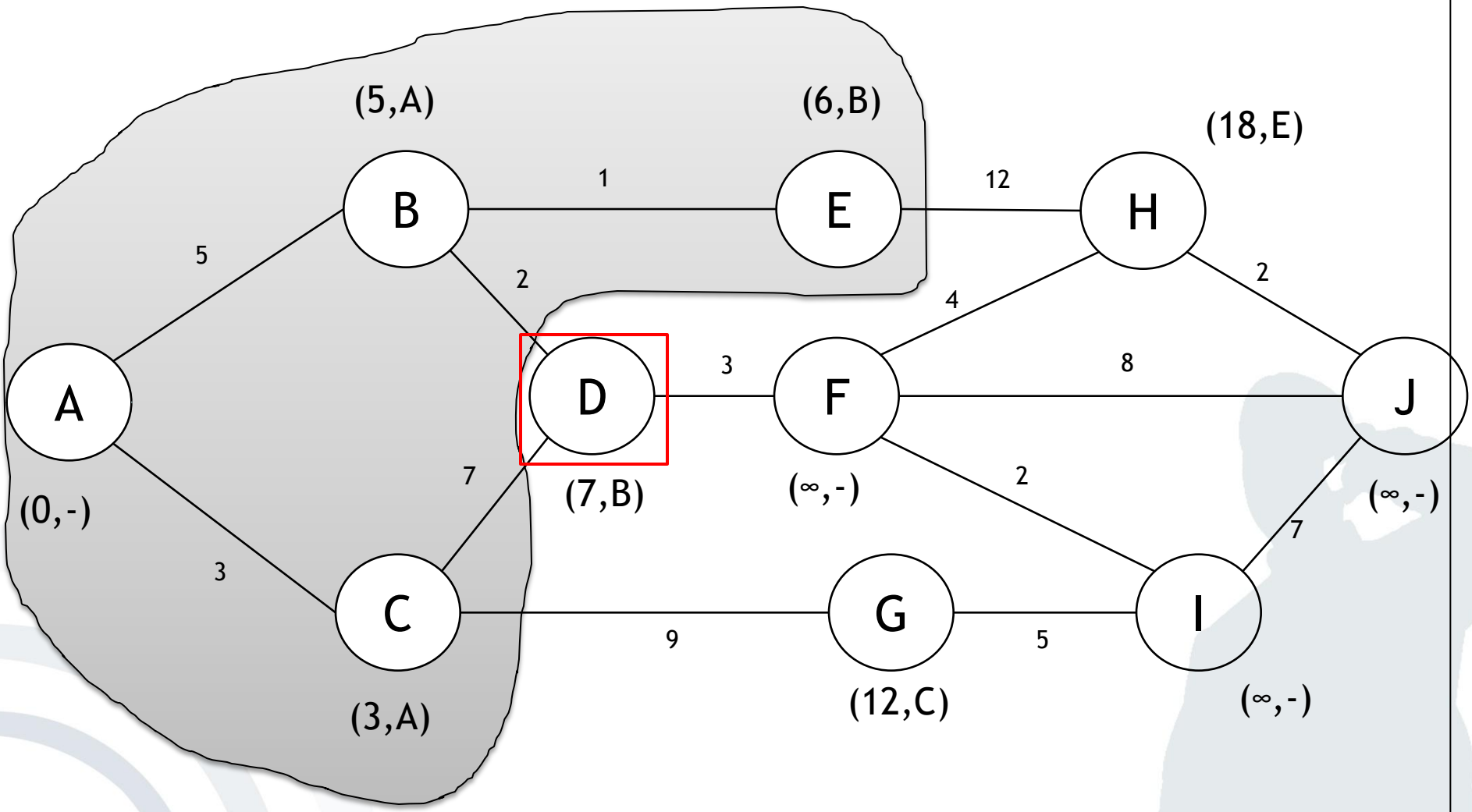

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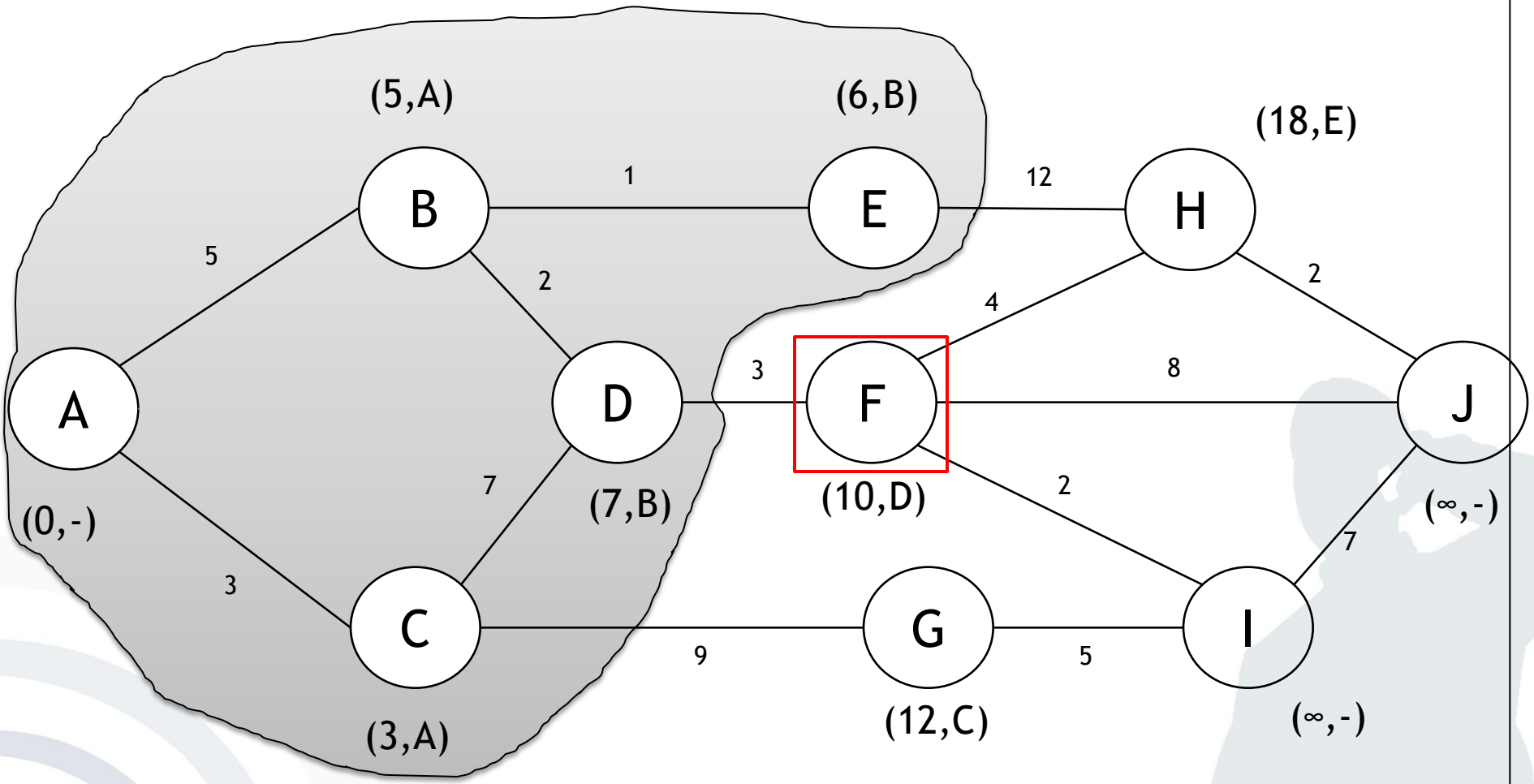

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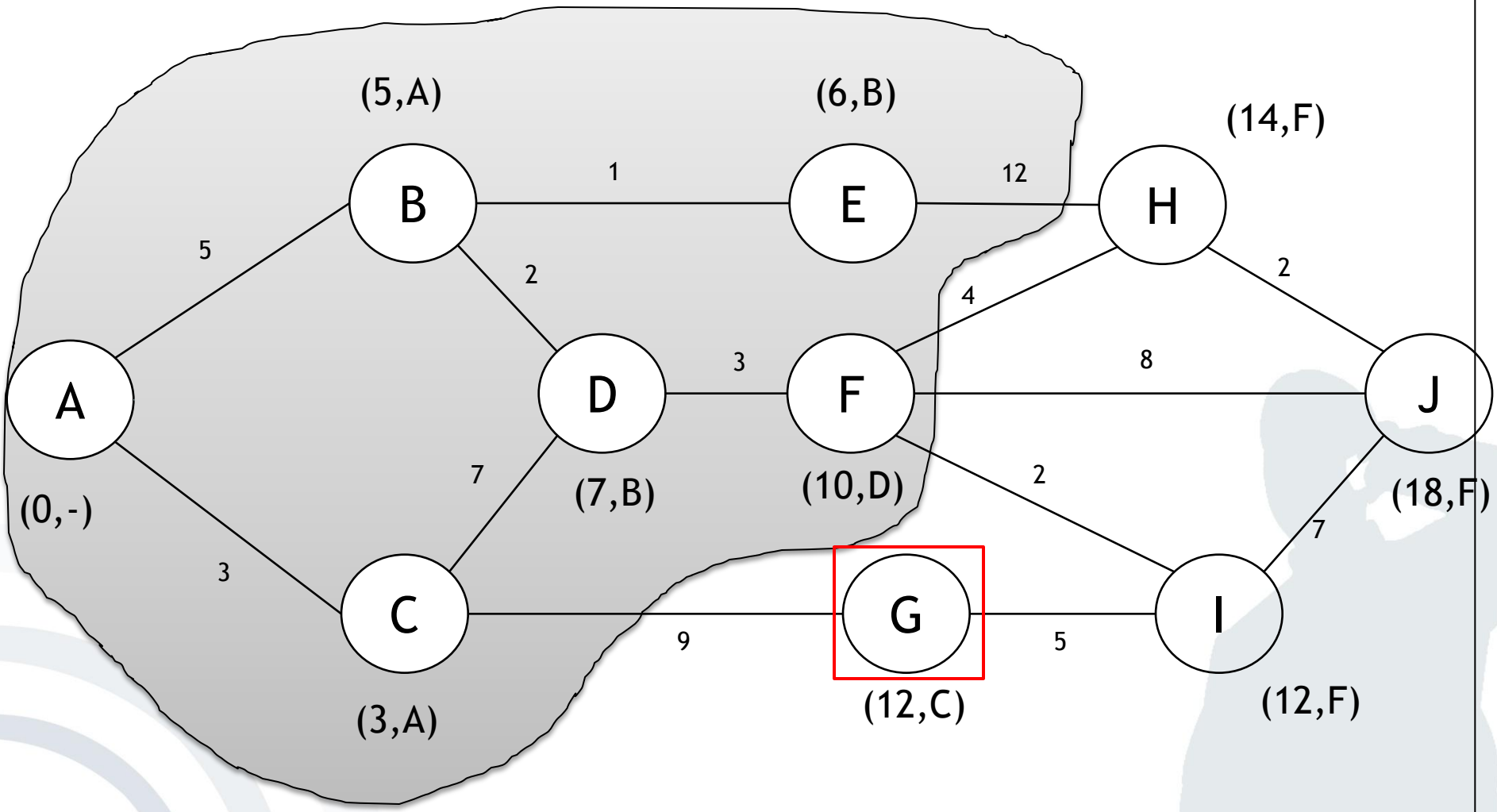

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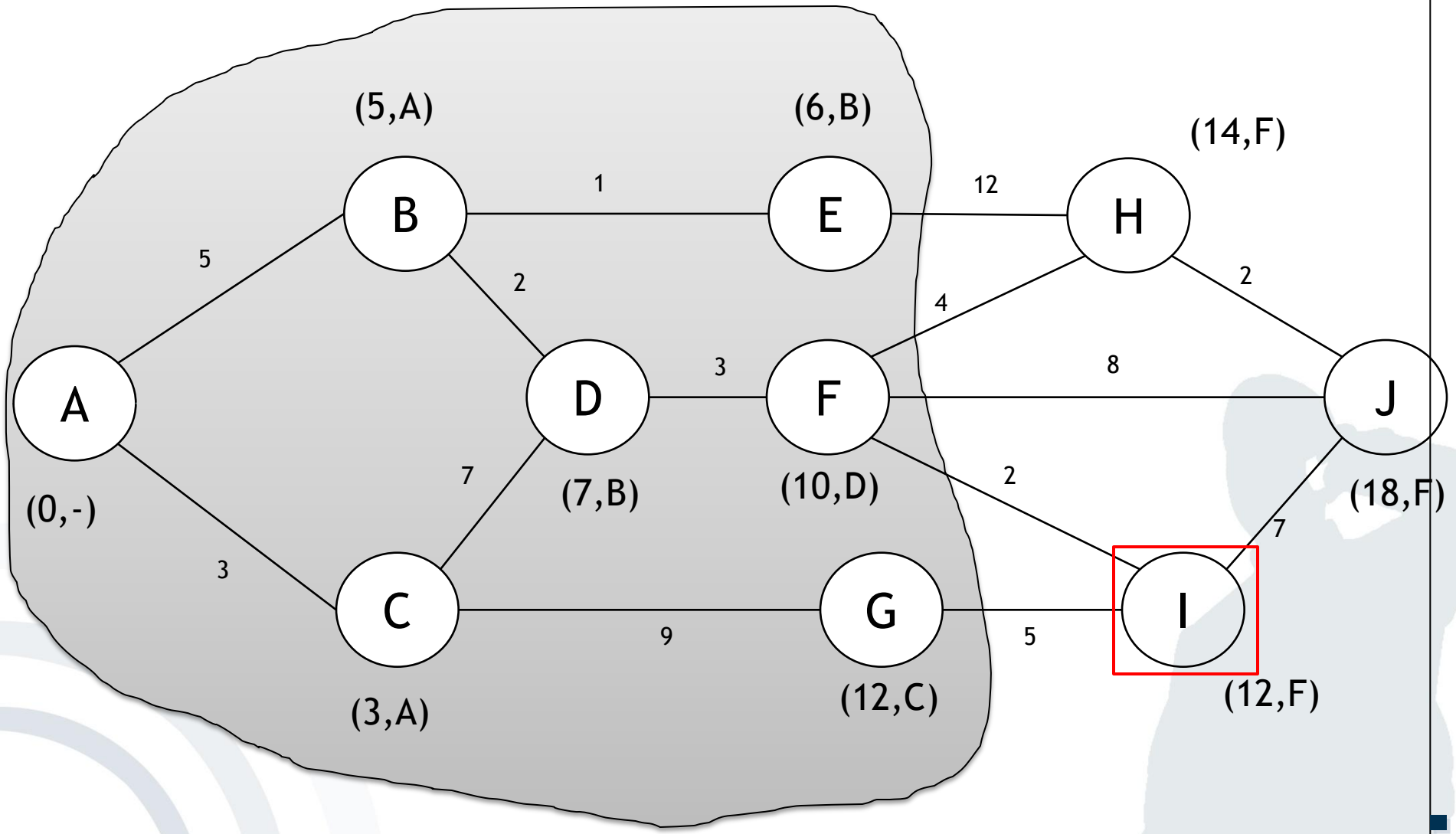

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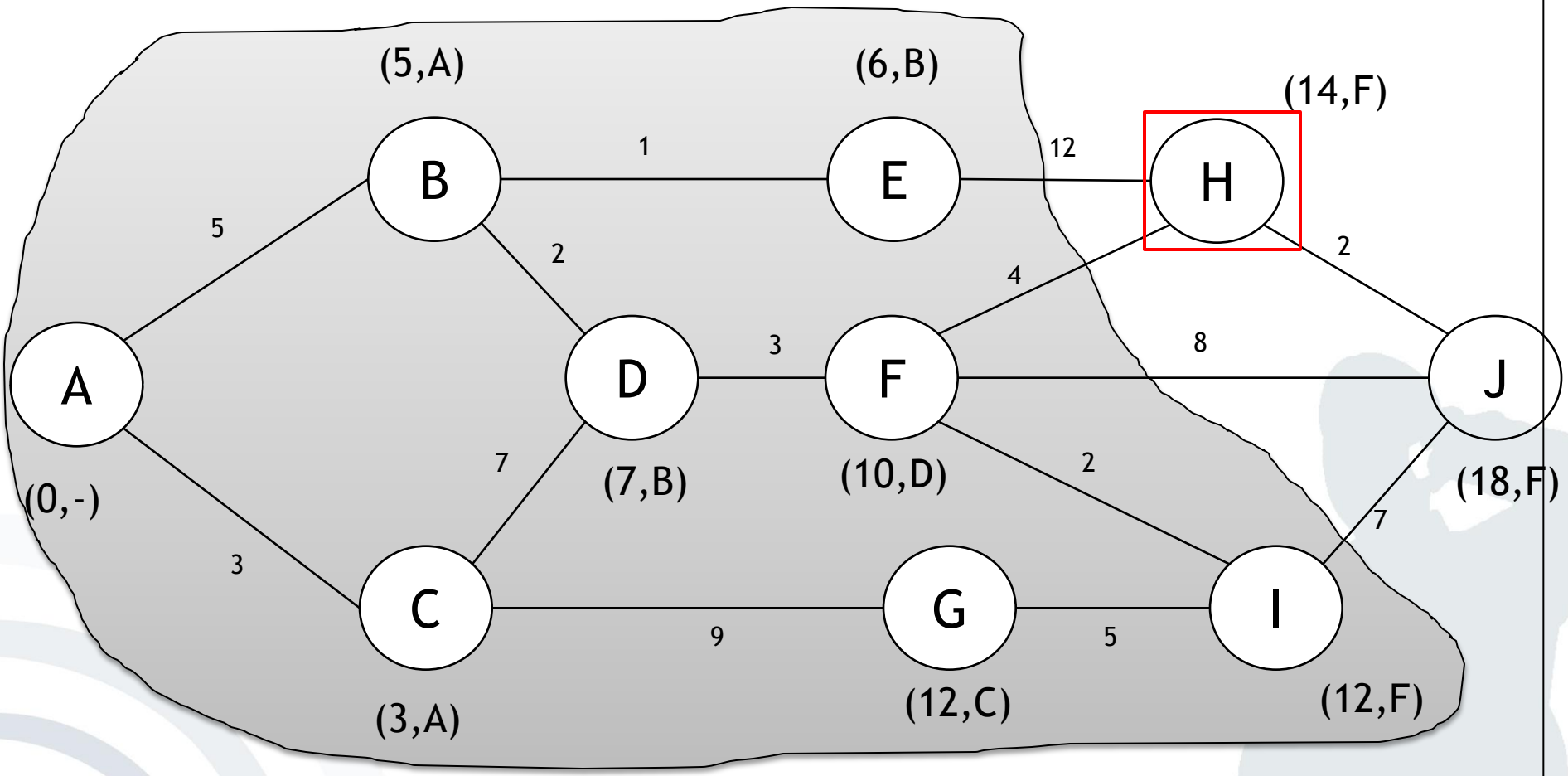

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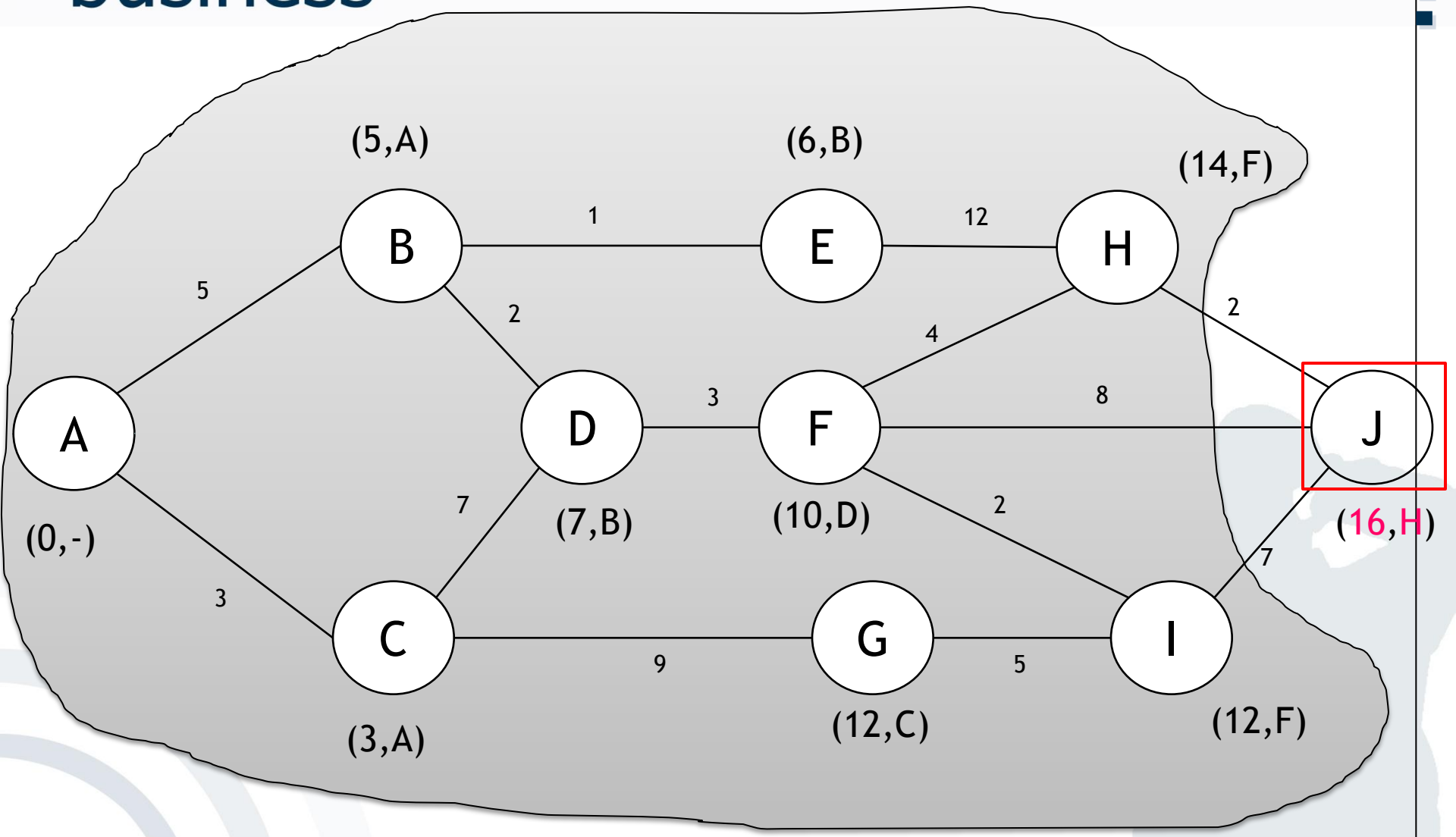

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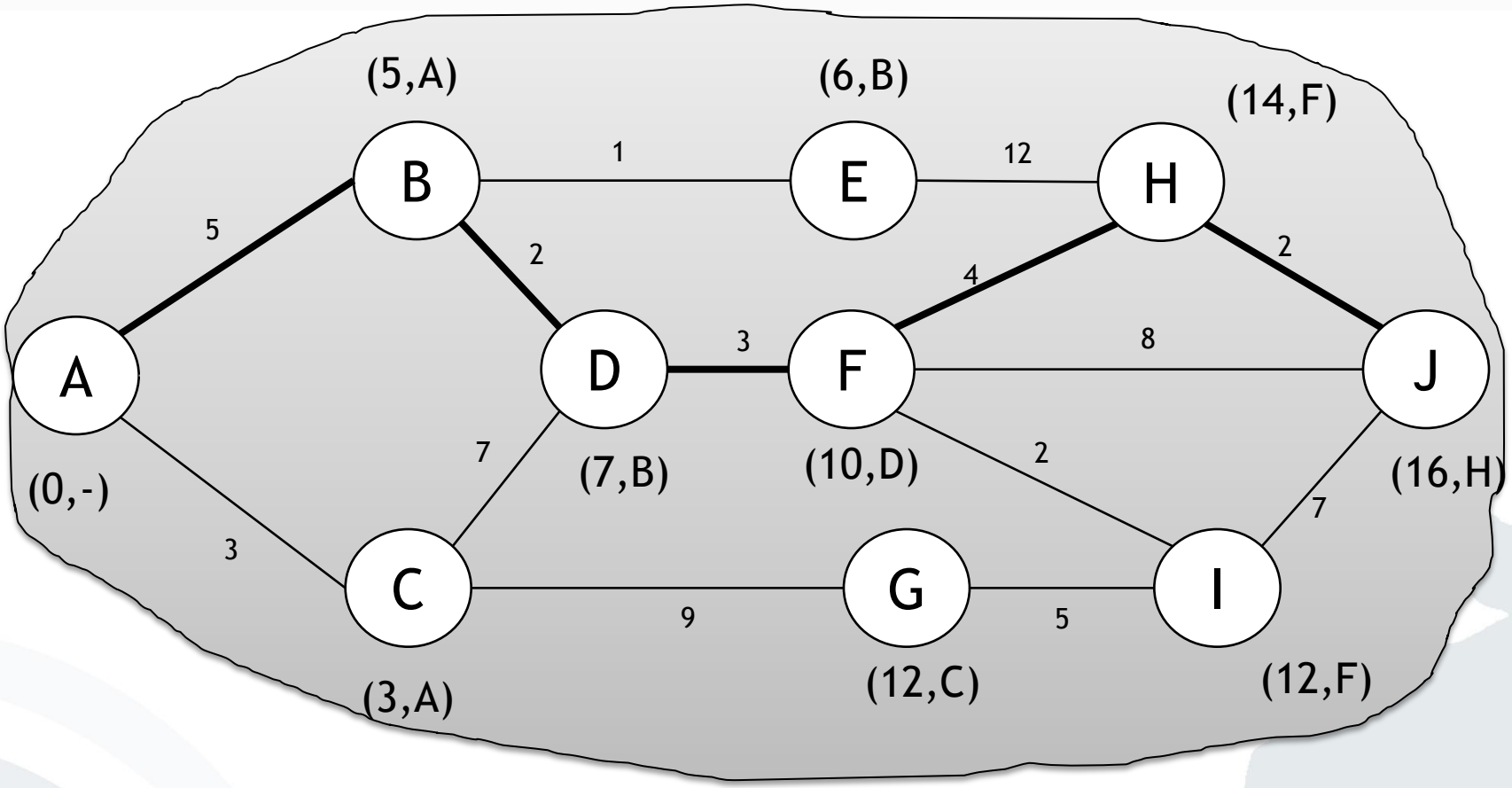
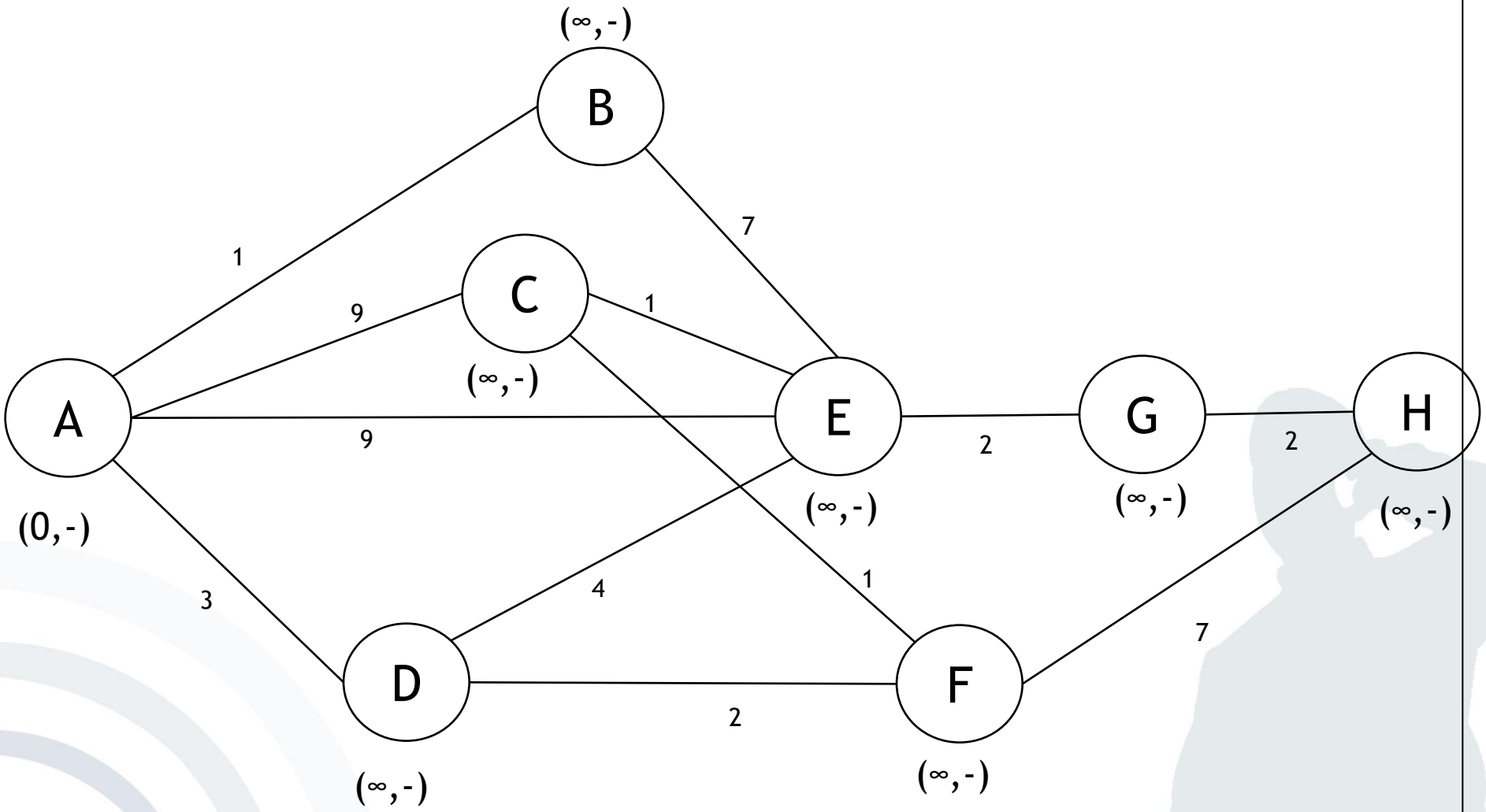


Shortest path: A → B → D → F → H → J

Dijkstra Algorithm (2)



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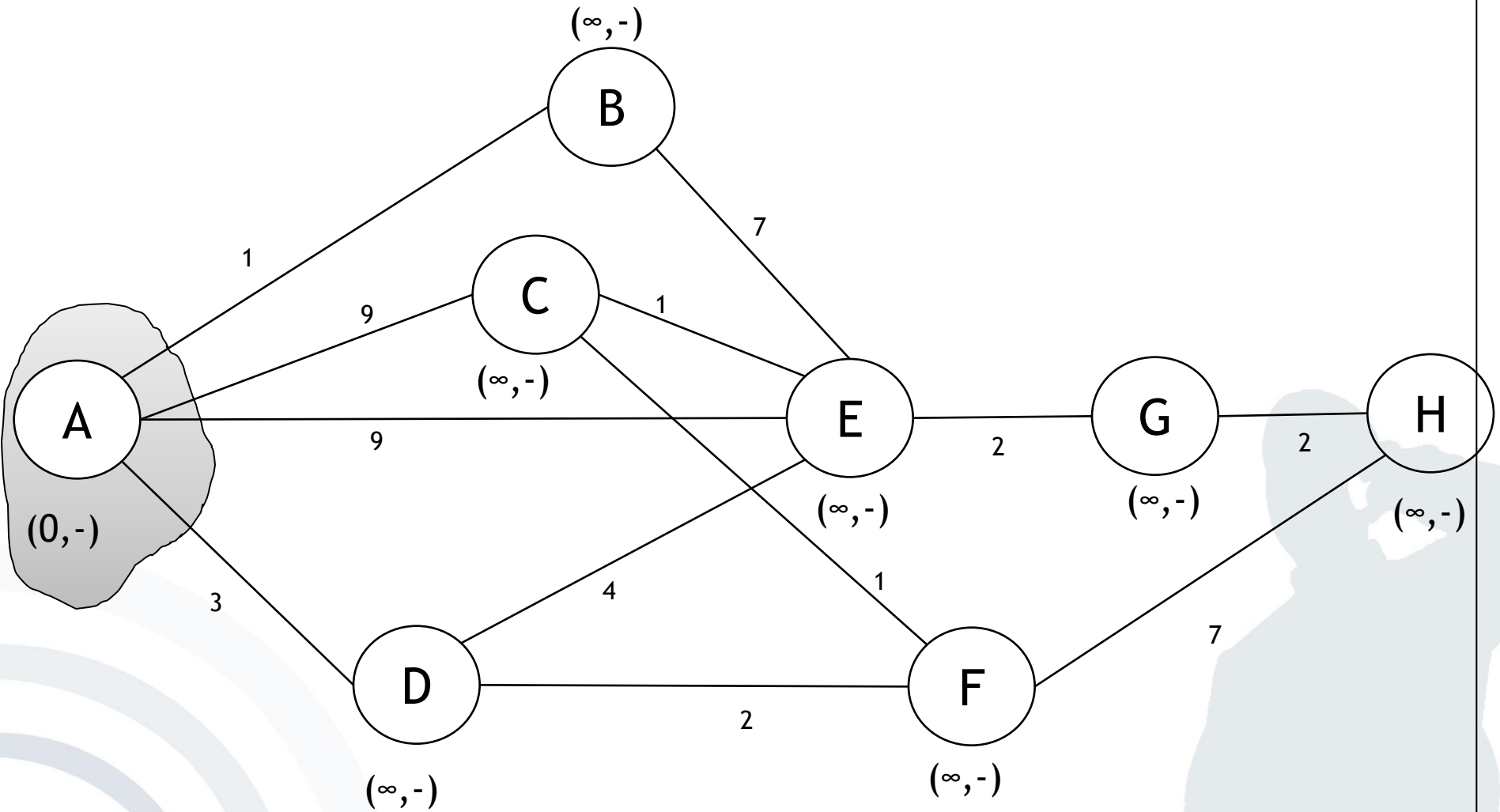

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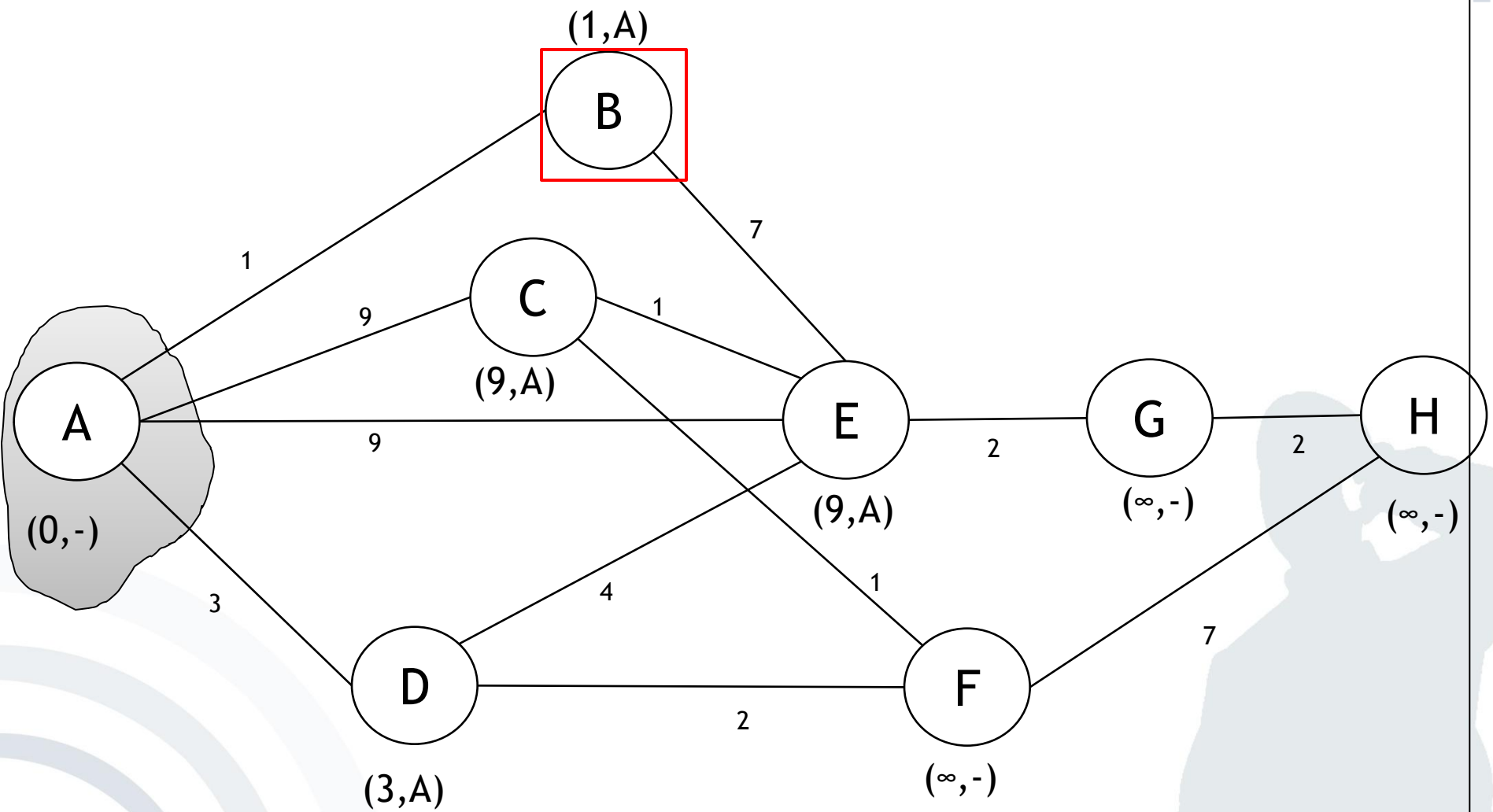

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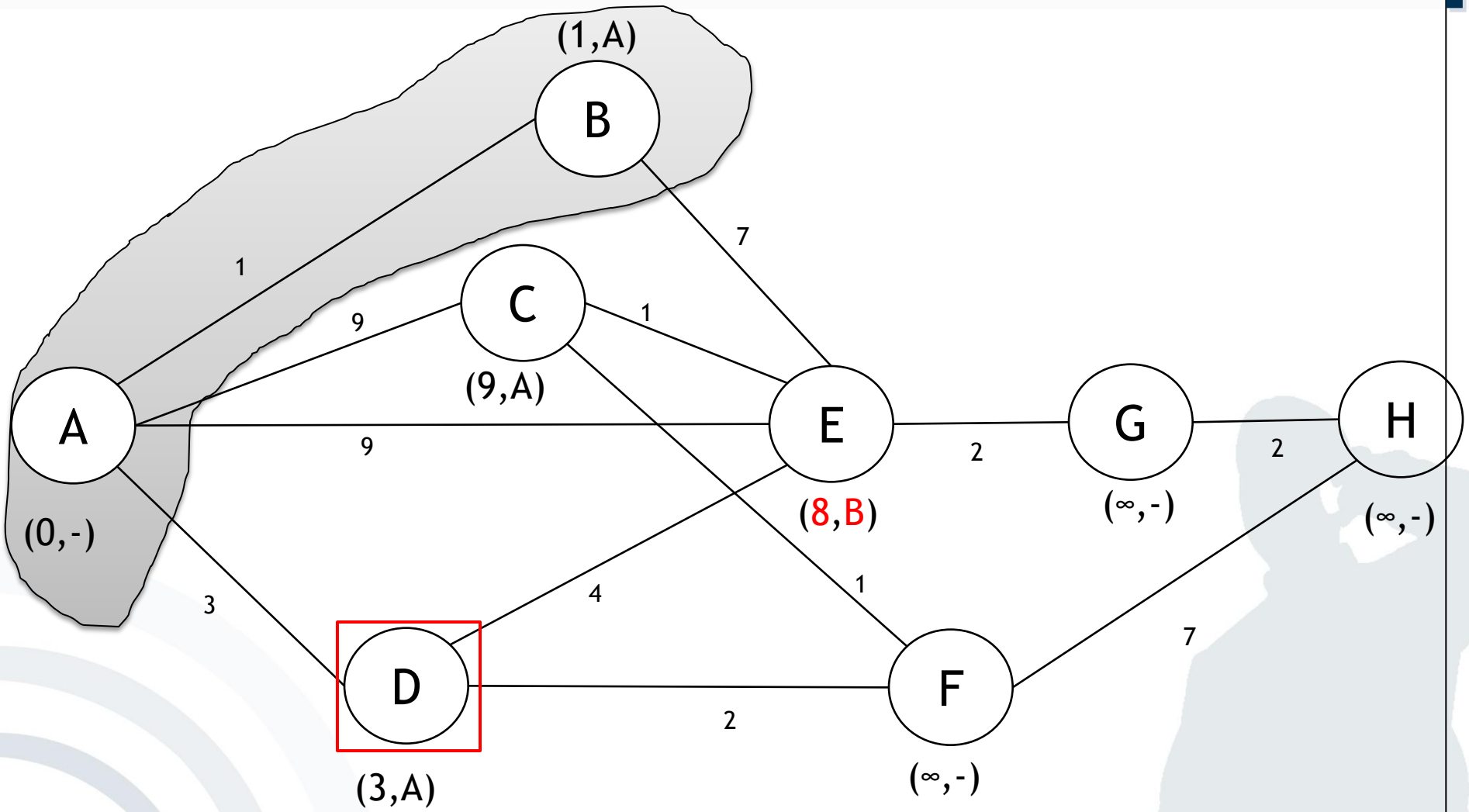

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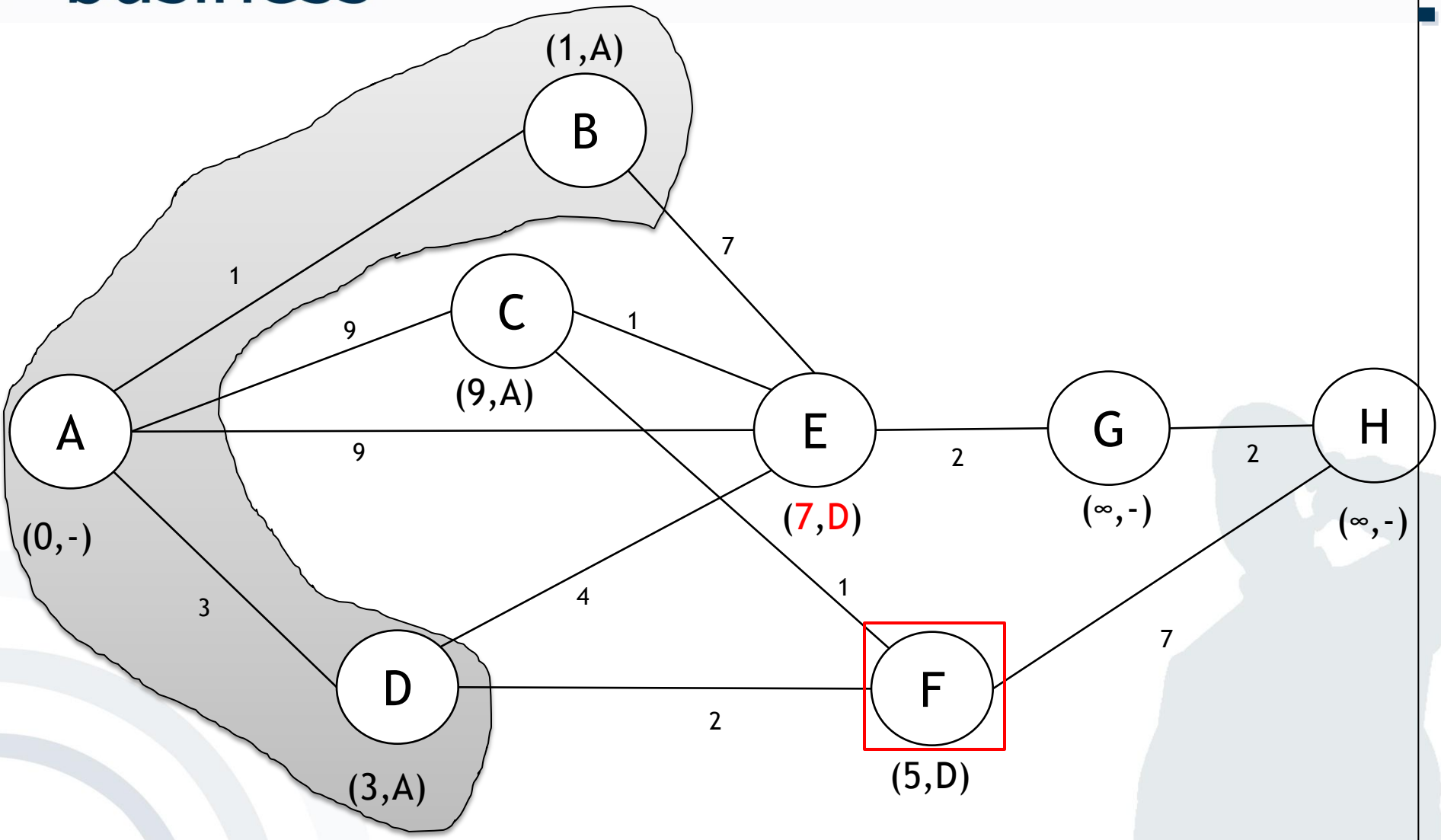

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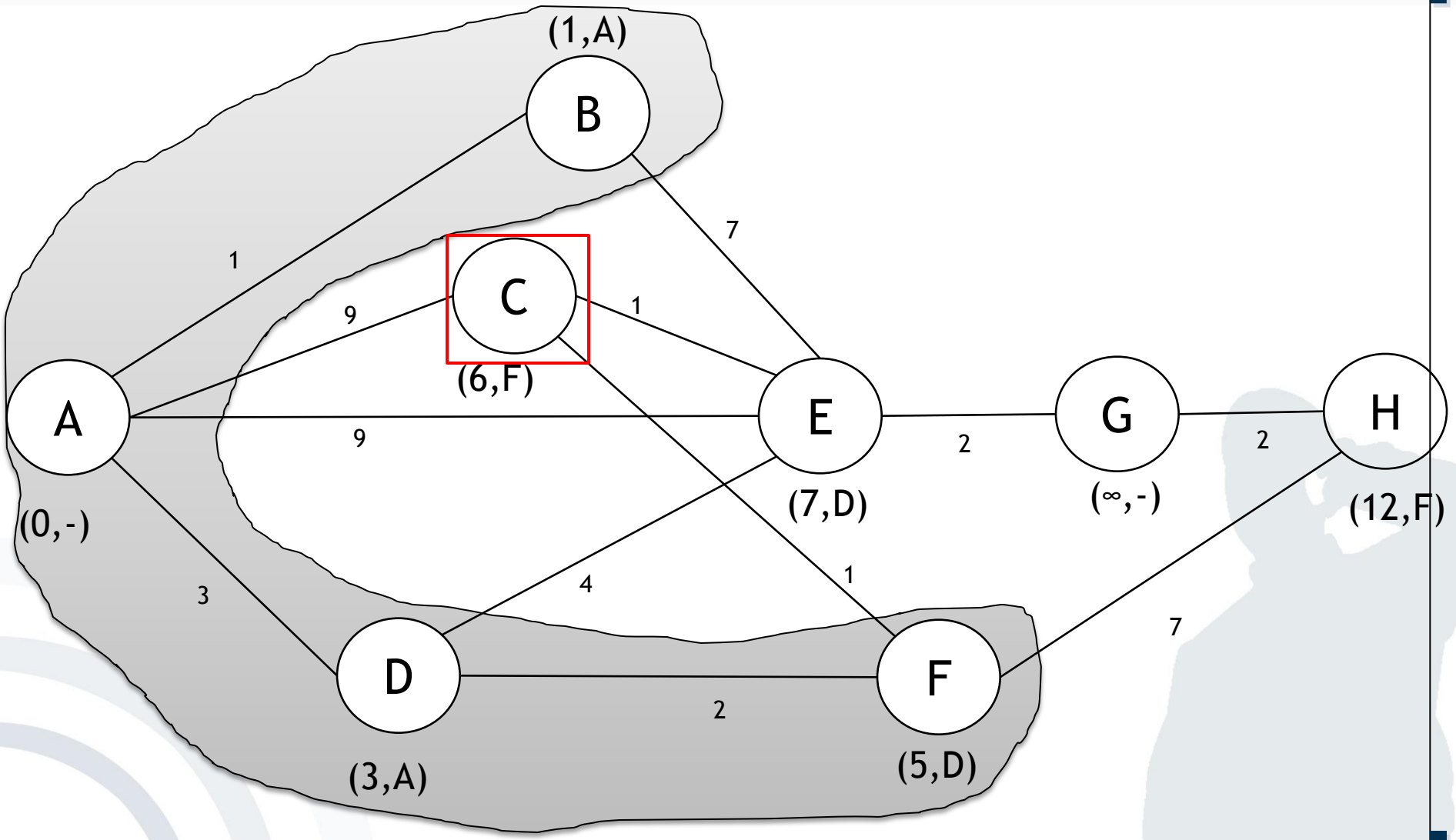

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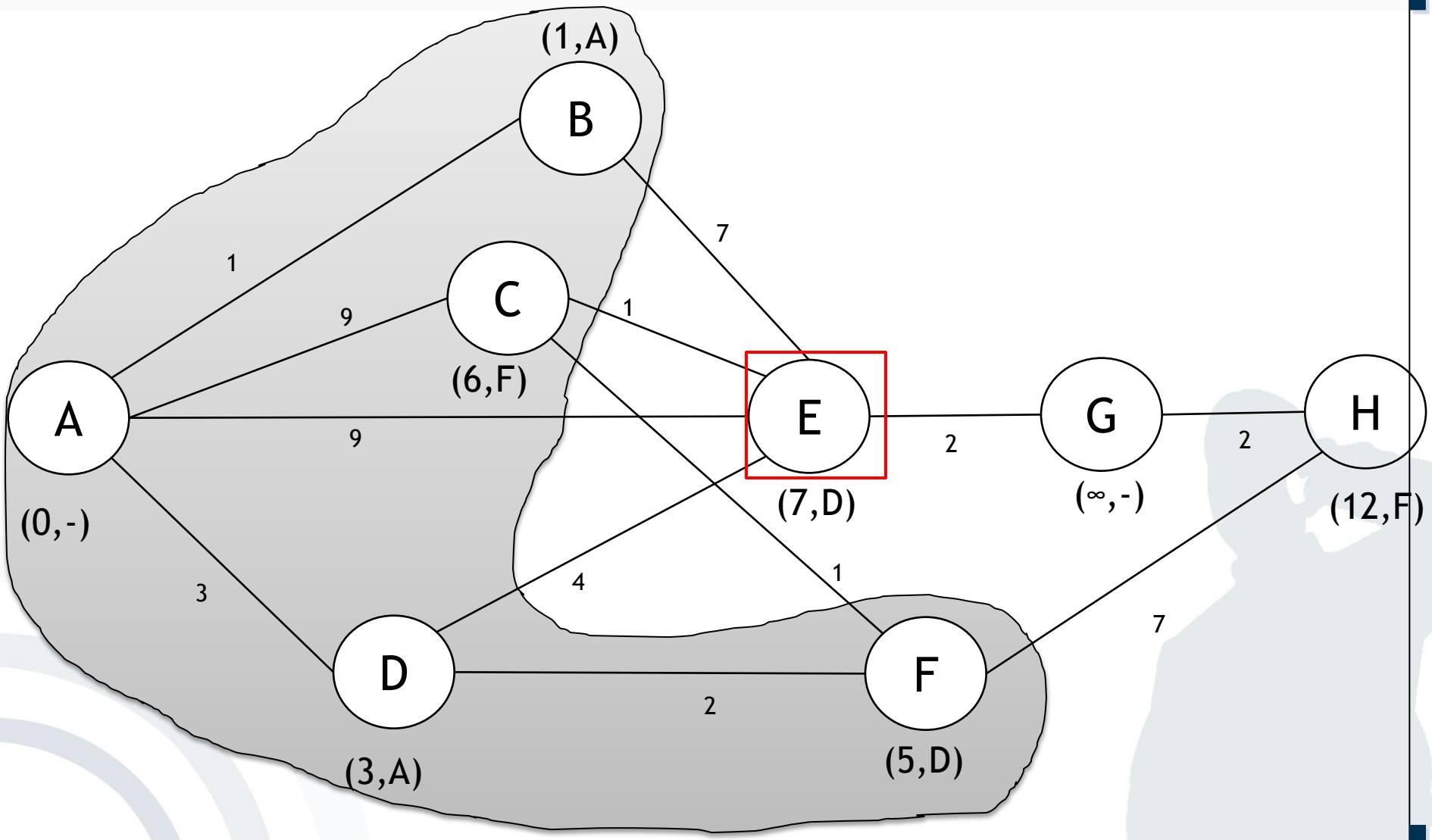

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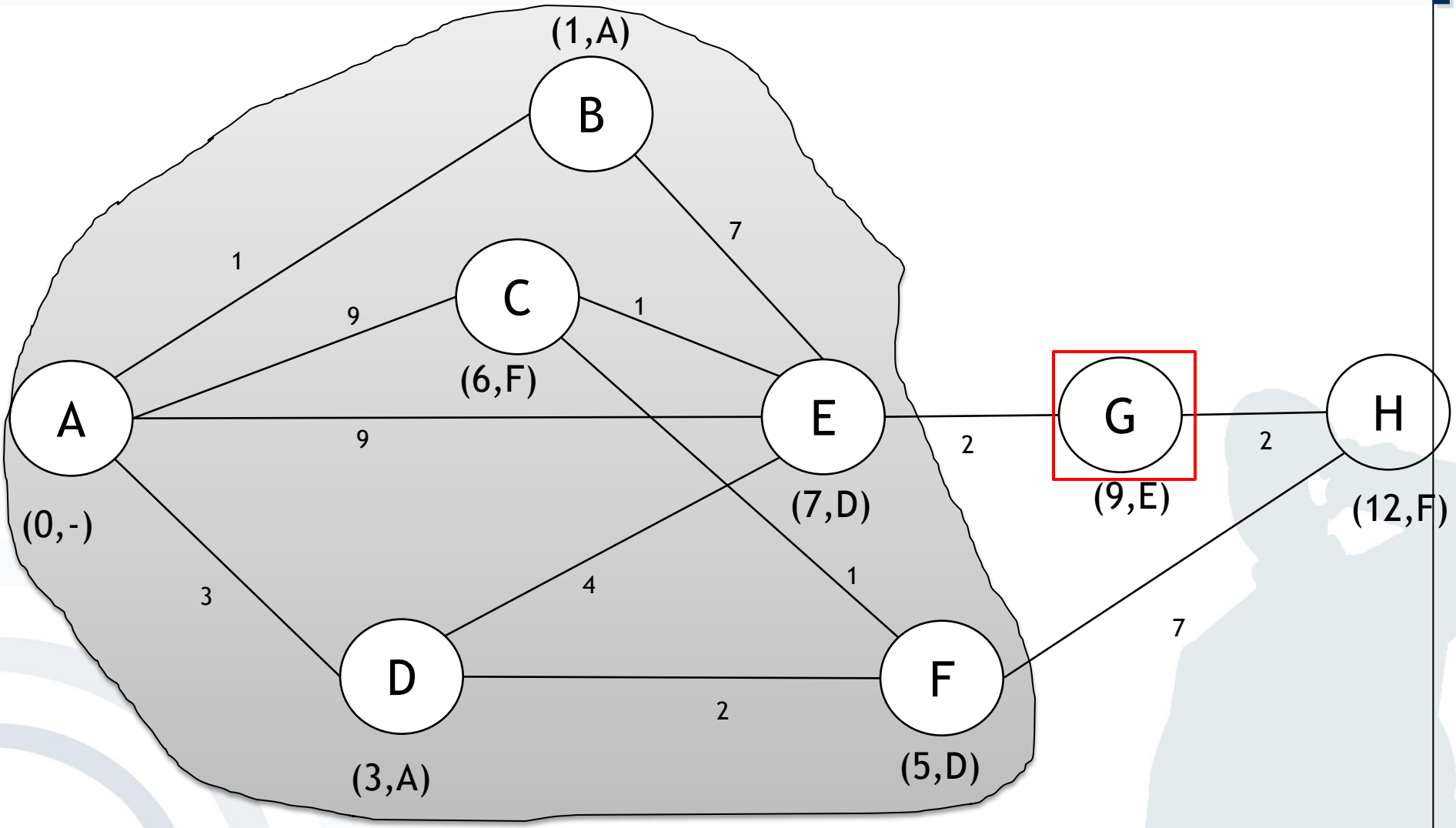

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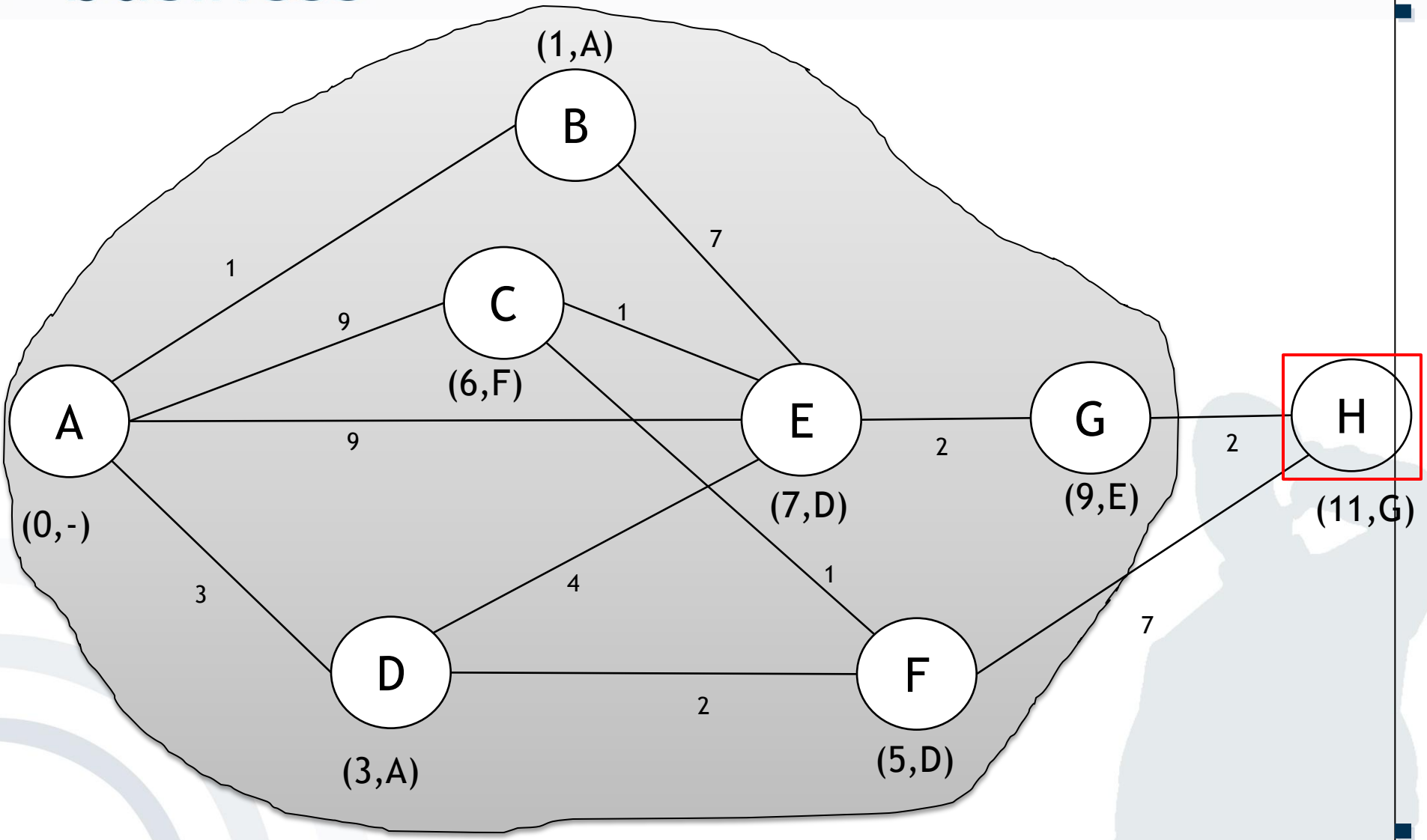

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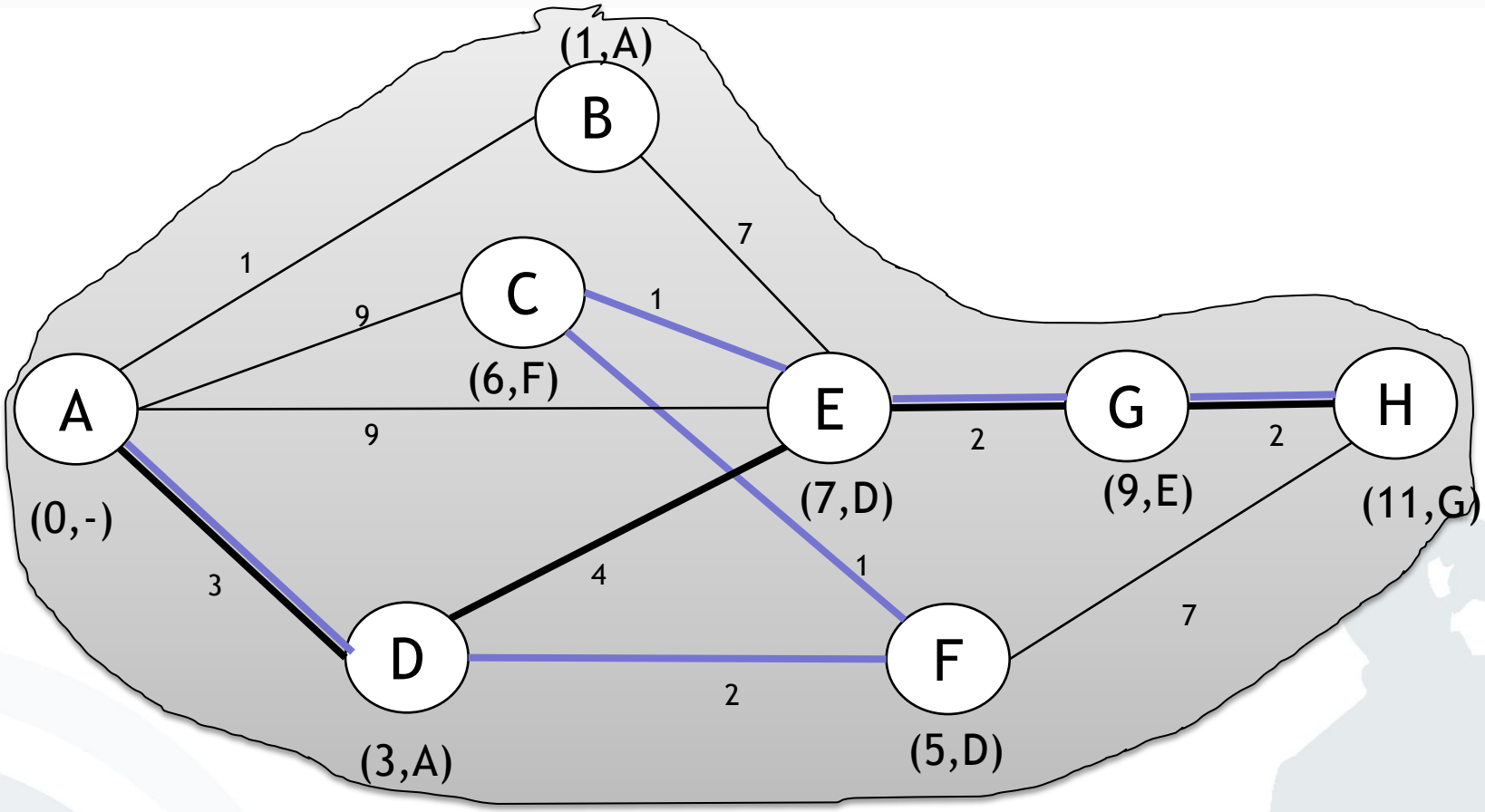

Shortest path: A → D → E → G → H

or: A → D → F → C → E → G → H