

Instituto Politécnico Nacional

Escuela Superior de Cómputo

* **UNIDAD DE APRENDIZAJE:** ANÁLISIS DE ALGORITMOS
* **PROFESOR:** EDGARDO ADRIÁN FRANCO MARTÍNEZ
* **ALUMNO:**

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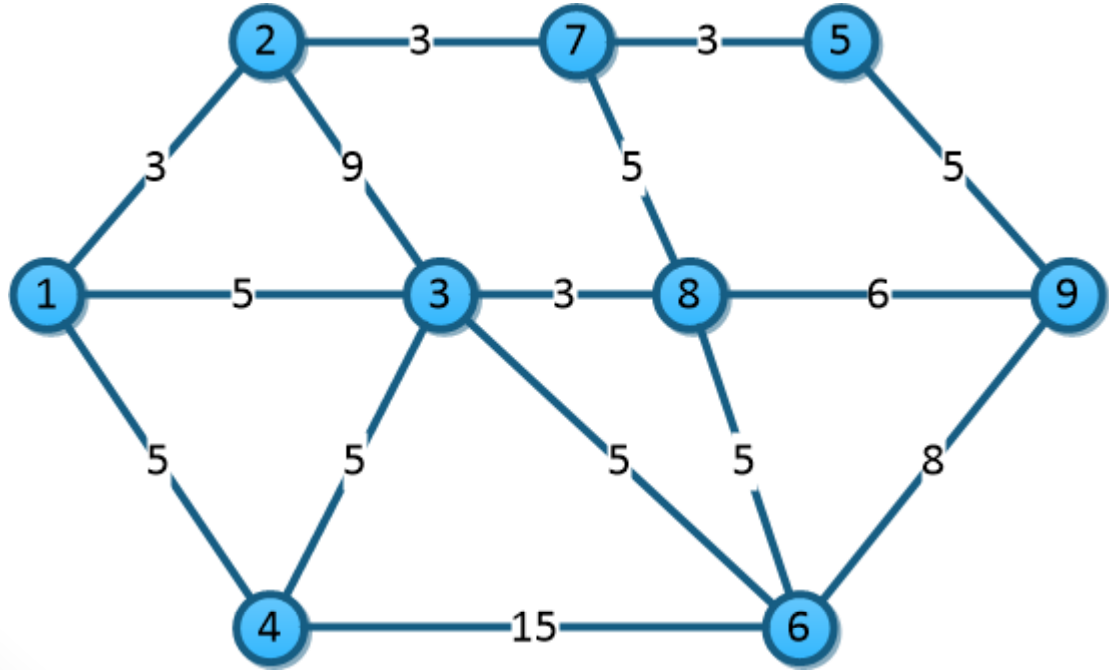
## **Ejercicio 9: Ejercicios sobre Prim, Kruskal y Dijkstra**

## 

* **GRUPO:** 3CM3

Para los siguientes grafos detallar la solución de la ruta más corta del nodo (1) a todos los nodos (Dijkstra) y el árbol recubridor mínimo mediante Prim y Kruskal. Describir de manera detallada los algoritmos y sus pasos.

# Ejercicio 1



## Dijkstra

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Nodo** | **Numero de iteración** | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **1** | (0, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **2** | (3, 1) | (3, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **3** | (5, 1) | (5, 1) | (5, 1) | **-** | **-** | **-** | **-** | **-** | **-** |
| **4** | (5, 1) | (5, 1) | (5, 1) | (5, 1) | **-** | **-** | **-** | **-** | **-** |
| **5** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (9, 7) | (9, 7) | (9, 7) | **-** | **-** |
| **6** | (**INF**, 1) | (**INF**, 1) | (10, 3) | (10, 3) | (10, 3) | (10, 3) | (10, 3) | (10, 3) | **-** |
| **7** | (**INF**, 1) | (6, 2) | (6, 2) | (6, 2) | (6, 2) | **-** | **-** | **-** | **-** |
| **8** | (**INF**, 1) | (**INF**, 1) | (8, 3) | (8, 3) | (8, 3) | (8, 3) | **-** | **-** | **-** |
| **9** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (14, 8) | (14, 8) | (14, 8) | (14, 8) |

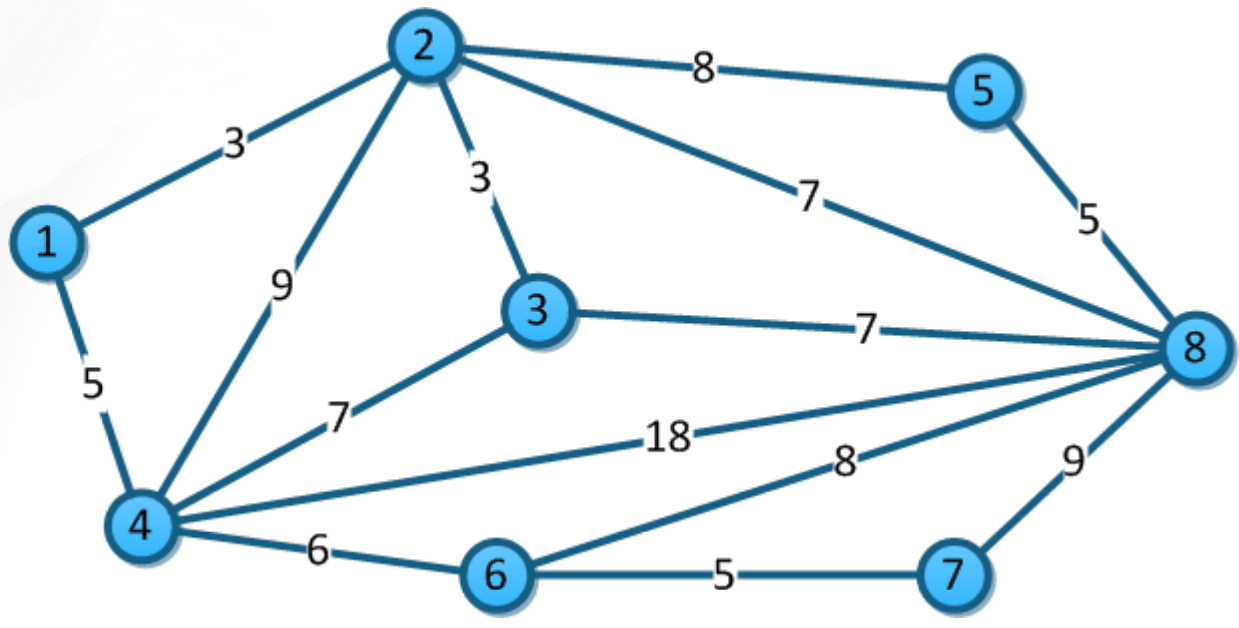
## Prim

## Kruskal

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# Ejercicio 2



## Dijkstra

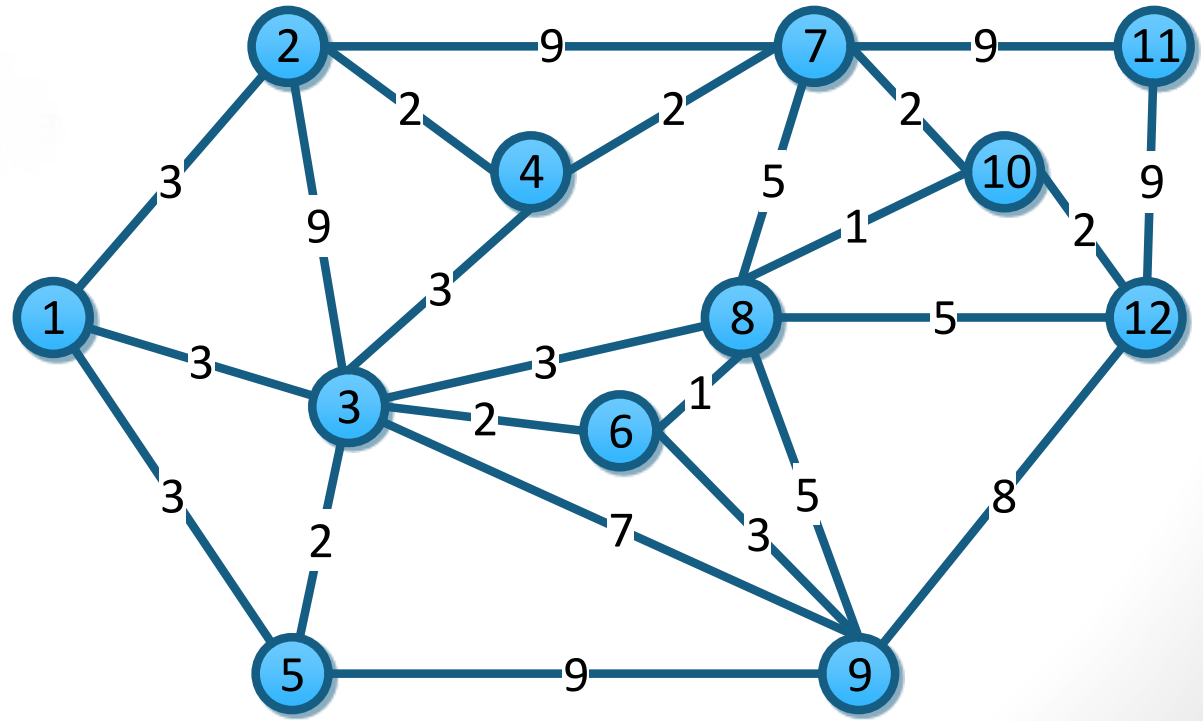
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Nodo** | **Numero de iteración** | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **1** | (0, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **2** | (3, 1) | (3, 1) | **-** | **-** | **-** | **-** | **-** | **-** |
| **3** | (**INF**, 1) | (6, 2) | (6, 2) | (6, 2) | **-** | **-** | **-** | **-** |
| **4** | (5, 1) | (5, 1) | (5, 1) | **-** | **-** | **-** | **-** | **-** |
| **5** | (**INF**, 1) | (11, 2) | (11, 2) | (11, 2) | (11, 2) | (11, 2) | **-** | **-** |
| **6** | (**INF**, 1) | (**INF**, 1) | (11, 4) | (11, 4) | (11, 4) | (11, 4) | (11, 4) | **-** |
| **7** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (19, 8) | (19, 8) | (16, 6) | (16, 6) |
| **8** | (**INF**, 1) | (10, 2) | (10, 2) | (10, 2) | (10, 2) | **-** | **-** | **-** |

## Prim

## Kruskal

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# Ejercicio 3



## Dijkstra

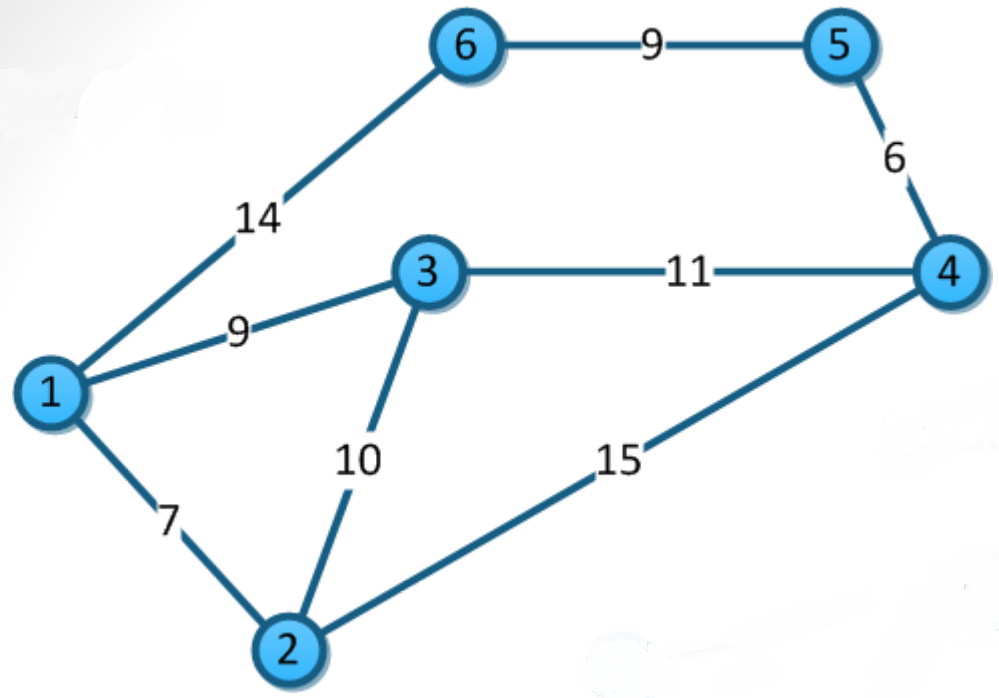
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Nodo** | **Numero de iteración** | | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **1** | (0, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **2** | (3, 1) | (3, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **3** | (3, 1) | (3, 1) | (3, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **4** | (**INF**, 1) | (5, 2) | (5, 2) | (5, 2) | (5, 2) | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **5** | (3, 1) | (3, 1) | (3, 1) | (3, 1) | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |
| **6** | (**INF**, 1) | (**INF**, 1) | (5, 3) | (5, 3) | (5, 3) | (5, 3) | **-** | **-** | **-** | **-** | **-** | **-** |
| **7** | (**INF**, 1) | (12, 2) | (12, 2) | (12, 2) | (7, 4) | (7, 4) | (7, 4) | (7, 4) | **-** | **-** | **-** | **-** |
| **8** | (**INF**, 1) | (**INF**, 1) | (6, 3) | (6, 3) | (6, 3) | (6, 3) | (6, 3) | **-** | **-** | **-** | **-** | **-** |
| **9** | (**INF**, 1) | (**INF**, 1) | (10, 3) | (10, 3) | (10, 3) | (8, 6) | (8, 6) | (8, 6) | (8, 6) | (8, 6) | **-** | **-** |
| **10** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (7, 8) | (7, 8) | (7, 8) | **-** | **-** | **-** |
| **11** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (16, 7) | (16, 7) | (16, 7) | (16, 7) | (16, 7) |
| **12** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (11, 8) | (11, 8) | (9, 10) | (9, 10) | (9, 10) | **-** |

## Prim

## Kruskal

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# Ejercicio 4



## Dijkstra

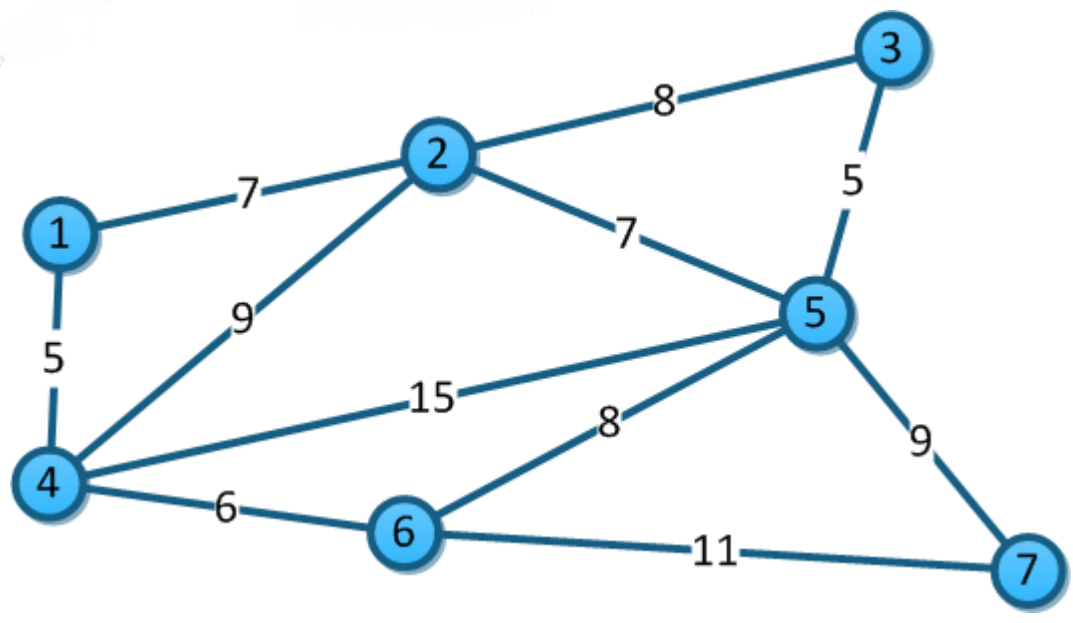
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Nodo** | **Numero de iteración** | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** |
| **1** | (0, 1) | **-** | **-** | **-** | **-** | **-** |
| **2** | (7, 1) | (7, 1) | **-** | **-** | **-** | **-** |
| **3** | (9, 1) | (9, 1) | (9, 1) | **-** | **-** | **-** |
| **4** | (**INF**, 1) | (22, 2) | (20, 3) | (20, 3) | (20, 3) | **-** |
| **5** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (23, 6) | (23, 6) | (23, 6) |
| **6** | (14, 1) | (14, 1) | (14, 1) | (14, 1) | **-** | **-** |

## Prim

## Kruskal

Fsd

# Ejercicio 5



## Dijkstra

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Nodo** | **Numero de iteración** | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **1** | (0, 1) | **-** | **-** | **-** | **-** | **-** | **-** |
| **2** | (7, 1) | (7, 1) | (7, 1) | **-** | **-** | **-** | **-** |
| **3** | (**INF**, 1) | (INF, 1) | (15, 2) | (15, 2) | (15, 2) | (15, 2) | **-** |
| **4** | (5, 1) | (5, 1) | **-** | **-** | **-** | **-** | **-** |
| **5** | (**INF**, 1) | (20, 4) | (14, 2) | (14, 2) | (14, 2) | **-** | **-** |
| **6** | (**INF**, 1) | (11, 4) | (11, 4) | (11, 4) | **-** | **-** | **-** |
| **7** | (**INF**, 1) | (**INF**, 1) | (**INF**, 1) | (22, 6) | (22, 6) | (22, 6) | (22, 6) |

## Prim

## Kruskal