**PREGUNTA 1 (25 Puntos) Grafo no Dirigido – Puntos de Articulación**

Determine los **puntos de articulación** del siguiente grafo no dirigido conexo con 10 nodos dado por nodo1-nodo2:

1-2, 1-8, 2-3, 2-4, 3-4, 3-5, 3-6, 4-6, 6-7, 6-9, 8-9, 9-10

En el análisis del grafo se debe comenzar en el nodo **1** y se debe avanzar en orden numérico si existen alternativas.

**PREGUNTA 2 (25 Puntos) Grafo no Dirigido**

Se realiza una búsqueda en amplitud partiendo desde el nodo A y se genera el árbol de extensión hasta llegar al nodo B. Por ejemplo, para el grafo 1-2, 1-4, 2-3, 2-5, 3-4, 4-6 se obtiene el árbol de extensión 1-2, 1-4, 2-3, 2-5, 4-3, 4-6. Si el nodo 1 es A y el nodo 6 es B se obtiene de 4-6 y 1-4 el camino con menos nodos 1-4-6.

**PREGUNTA 3 (10 + 15 = 25 Puntos) Ordenamiento – Insertion + Shell Sort**

Insertion Sort

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 70 | 50 | 80 | 20 | 30 | 90 | 10 | 60 | 40 |
| 50 | 70 |  |  |  |  |  |  |  |
| 20 | 50 | 70 | 80 |  |  |  |  |  |
|  | 30 | 50 | 70 | 80 |  |  |  |  |
| 10 | 20 | 30 | 50 | 70 | 80 | 90 |  |  |
|  |  |  |  | 60 | 70 | 80 | 90 |  |
|  |  |  | 40 | 50 | 60 | 70 | 80 | 90 |

Shell Sort h=2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 70 | 50 | 80 | 20 | 30 | 90 | 10 | 60 | 40 |
|  |  |  | 50 |  |  |  |  |  |
|  | 20 |  |  |  |  |  |  |  |
|  |  |  |  | 80 |  |  |  |  |
| 30 |  | 70 |  |  |  |  |  |  |
|  |  |  |  |  |  | 80 |  |  |
|  |  |  |  | 70 |  |  |  |  |
|  |  | 30 |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | 90 |  |
|  |  |  |  |  | 60 |  |  |  |
|  |  |  |  |  |  |  |  | 80 |
|  |  |  |  |  |  | 70 |  |  |
|  |  |  |  | 40 |  |  |  |  |
| 10 | 20 | 30 | 50 | 40 | 60 | 70 | 90 | 80 |

Shell Sort h=1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 20 | 30 | 50 | 40 | 60 | 70 | 90 | 80 |
|  |  |  |  | 50 |  |  |  |  |
|  |  |  | 40 |  |  |  |  |  |
|  |  |  |  |  |  |  |  | 90 |
|  |  |  |  |  |  |  | 80 |  |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |

**PREGUNTA 4 (25 Puntos) Ordenamiento – Heap Sort**

Ordene de menor a mayor con el algoritmo Heap Sort los 9 números del siguiente arreglo:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 70 | 50 | 80 | 20 | 30 | 90 | 10 | 60 | 40 |
| 80 |  | 70 |  |  |  |  |  |  |
|  |  | 90 |  |  | 70 |  |  |  |
| 90 |  | 80 |  |  |  |  |  |  |
|  |  |  | 60 |  |  |  | 20 |  |
|  | 60 |  | 50 |  |  |  |  |  |
| 90 | 60 | 80 | 50 | 30 | 70 | 10 | 20 | 40 |
| 40 |  |  |  |  |  |  |  | 90 |
| 80 |  | 40 |  |  |  |  |  |  |
|  |  | 70 |  |  | 40 |  |  |  |
| 20 |  |  |  |  |  |  | 80 | 90 |
| 70 |  | 20 |  |  |  |  |  |  |
|  |  | 40 |  |  | 20 |  |  |  |
| 10 |  |  |  |  |  | 70 | 80 | 90 |
| 60 | 10 |  |  |  |  |  |  |  |
|  | 50 |  | 10 |  |  |  |  |  |
| 20 |  |  |  |  | 60 | 70 | 80 | 90 |
| 50 | 20 |  |  |  |  |  |  |  |
|  | 30 |  |  | 20 |  |  |  |  |
| 20 |  |  |  | 50 | 60 | 70 | 80 | 90 |
| 40 |  | 20 |  |  |  |  |  |  |
| 10 |  |  | 40 | 50 | 60 | 70 | 80 | 90 |
| 30 | 10 |  |  |  |  |  |  |  |
| 20 |  | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |