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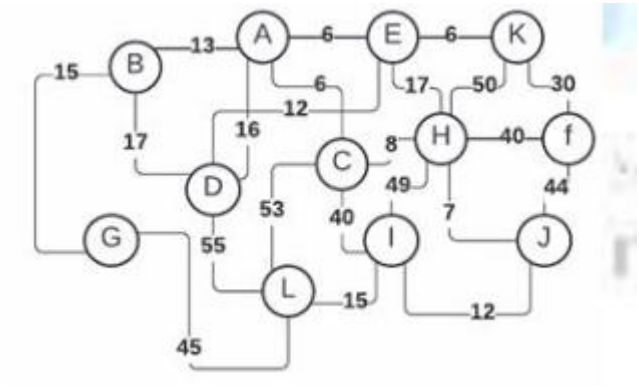
Prodi: Sistem Informasi

Mata Kuliah: Struktur Data CR003

**Soal:**

2. Tentukan jalur terpendek dari A ke L dengan Graf berikut!




**Jawaban:**

Cara 1 (manual):

Hitung satu persatu perkiraan jalur terpendek (disini saya menggunakan excel untuk mempercepat perhitungan):

| Node | jarak 1 | jarak 2 | jarak 3 | JUMLAH |
|---|---|---|---|---|
| ABGL | 13 | 15 | 45 | 73 |
| ABDL | 13 | 17 | 55 | 85 |
| ACIL | 6 | 40 | 15 | 61 |

Dari perkiraan jumlah node tersebut, didapatkan node ACIL dengan nilai 61 merupakan jalur terpendek.

Cara 2 (menggunakan python):

```python
mport heapq

graph = {
    'A': {'B': 13, 'C': 6, 'E': 6},
    'B': {'A': 13, 'G': 17},
    'C': {'A': 6, 'D': 12, 'H': 40, 'I': 40},
    'D': {'C': 12, 'G': 55, 'L': 45},
    'E': {'A': 6, 'H': 17, 'K': 6},
    'F': {'H': 50, 'K': 30, 'J': 44},
    'G': {'B': 17, 'D': 55},
    'H': {'C': 40, 'E': 17, 'F': 50, 'I': 49},
    'I': {'C': 40, 'H': 49, 'J': 7, 'L': 15},
    'J': {'F': 44, 'I': 7},
    'K': {'E': 6, 'F': 30},
    'L': {'D': 45, 'I': 15},
}

def dijkstra(graph, start, end):
    queue = [(0, start, [])]
    distances = {node: float('infinity') for node in graph}
    distances[start] = 0
    visited = set()

    while queue:
        (current_distance, current_node, path) = heapq.heappop(queue)
        if current_node in visited:
            continue
        visited.add(current_node)
        path = path + [current_node]

        if current_node == end:
            return current_distance, path

        for neighbor, weight in graph[current_node].items():
            distance = current_distance + weight
            if distance < distances[neighbor]:
                distances[neighbor] = distance
                heapq.heappush(queue, (distance, neighbor, path))

    return float('infinity'), []

shortest_distance, shortest_path = dijkstra(graph, 'A', 'L')
print(f"Jarak terpendek: {shortest_distance}")
print(f"Jalur terpendek: {' -> '.join(shortest_path)}")
```

Output:

```
PROBLEMS  TERMINAL  PORTS  DEBUG CONSOLE  OUTPUT

PS C:\Users\USER\Documents\Esa Unggul\UAS\Struktur Data> python
Jarak terpendek: 61
Jalur terpendek: A -> C -> I -> L
PS C:\Users\USER\Documents\Esa Unggul\UAS\Struktur Data>
```