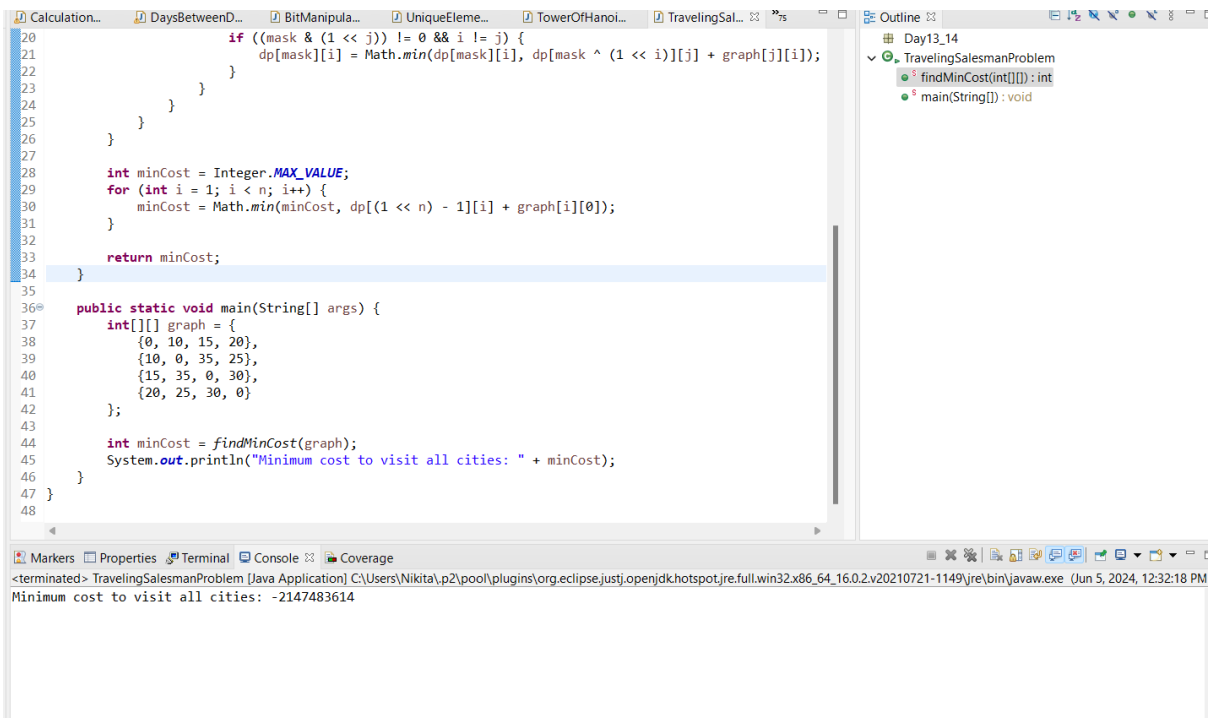
Task 2: Traveling Salesman Problem

Create a function int FindMinCost(int[,] graph) that takes a 2D array representing the graph where graph[i][j] is the cost to travel from city i to city j. The function should return the minimum cost to visit all cities and return to the starting city. Use dynamic programming for this solution.

```
package Day13_14;

public class TravelingSalesmanProblem {
    public static int findMinCost(int[][] graph) {
        int n = graph.length;
        int[][] dp = new int[1 << n][n];

        for (int i = 0; i < (1 << n); i++) {
            for (int j = 0; j < n; j++) {
                dp[i][j] = Integer.MAX_VALUE;
            }
        }

        dp[1][0] = 0;

        for (int mask = 1; mask < (1 << n); mask += 2) {
            for (int i = 0; i < n; i++) {
                if ((mask & (1 << i)) != 0) {
                    for (int j = 0; j < n; j++) {
                        if ((mask & (1 << j)) != 0 && i != j) {
                            dp[mask][i] = Math.min(dp[mask][i], dp[mask ^ (1 <<
i)][j] + graph[j][i]);
                        }
                    }
                }
            }
        }

        int minCost = Integer.MAX_VALUE;
        for (int i = 1; i < n; i++) {
            minCost = Math.min(minCost, dp[(1 << n) - 1][i] + graph[i][0]);
        }

        return minCost;
    }

    public static void main(String[] args) {
        int[][] graph = {
            {0, 10, 15, 20},
            {10, 0, 35, 25},
            {15, 35, 0, 30},
            {20, 25, 30, 0}
        };

        int minCost = findMinCost(graph);
        System.out.println("Minimum cost to visit all cities: " + minCost);
    }
}
```


Calculation...
DaysBetweenD...
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UniqueEleme...
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Outline
Day13_14
TravelingSalesmanProblem
findMinCost(int[][]) : int
main(String[]) : void
if ((mask & (1 << j)) != 0 && i != j) {
dp[mask][i] = Math.min(dp[mask][i], dp[mask ^ (1 << i)][j] + graph[j][i]);
}
}
}
}
}
int minCost = Integer.MAX_VALUE;
for (int i = 1; i < n; i++) {
minCost = Math.min(minCost, dp[(1 << n) - 1][i] + graph[i][0]);
}
return minCost;
}
public static void main(String[] args) {
int[][] graph = {
{0, 10, 15, 20},
{10, 0, 35, 25},
{15, 35, 0, 30},
{20, 25, 30, 0}
};
int minCost = findMinCost(graph);
System.out.println("Minimum cost to visit all cities: " + minCost);
}
}
Markers
Properties
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Console
Coverage
<terminated> TravelingSalesmanProblem [Java Application] C:\Users\Nikita\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe (Jun 5, 2024, 12:32:18 PM
Minimum cost to visit all cities: -2147483614