

EcoTrail — Global Hiking Community Platform (Enhanced)

EcoTrail tracks popular hiking trails visited by individuals, recording each trail's region, difficulty level, and the number of times it has been hiked. The organization wants a software system to: Add trail records, retrieve a trail by ID, identify the most-hiked trails, provide summaries by region and difficulty, update hike counts, filter by region/difficulty, get top-N trails per region, and provide difficulty-wise statistics.

Component Specification: Trail (Model Class)

Class: Trail

Attributes

- String trailId
- String name
- String region (e.g., Alps, RockyMountains, Sahyadri)
- String difficulty (e.g., Easy, Moderate, Hard)
- int hikeCount

Methods

Necessary getters, setters, no-argument constructor, and a five-argument constructor are provided as part of the code skeleton.

Component Specification: TrailUtil (Utility Class)

Class: TrailUtil

Attributes

- private List trailList

Methods

Getter and setter methods for the attribute are included in the code skeleton.

Note: TrailUtil holds a list of Trail objects where each Trail has details such as trailId, name, region, difficulty, and hikeCount.

Requirements (with explicit return types)

Requirement 1: Add Trail Record

```
public void addTrailRecord(Trail trail)
```

Return Type: void

Requirement 2: Retrieve Trail Detail by ID

```
public Trail getTrailById(String trailId)
```

Return Type: Trail

Requirement 3: Retrieve Most-Hiked Trails

```
public Set getMostHikedTrails()
```

Return Type: Set

Requirement 4: Region-wise Hike Counts

```
public Map getHikeCountByRegion()
```

Return Type: Map (Key: region, Value: total hike count)

Requirement 5: Group Trails by Difficulty

```
public Map> groupTrailsByDifficulty( )
```

Return Type: Map> (Key: difficulty, Value: list of trails)

Requirement 6: Update Hike Count by Trail ID

```
public boolean updateHikeCount(String trailId, int additionalHikes)
```

Return Type: boolean

Requirement 7: Filter Trails by Region and Difficulty

```
public List filterTrails(String region, String difficulty)
```

Return Type: List

Requirement 8: Top-N Trails per Region

```
public Map> getTopTrailsByRegion(int n)
```

Return Type: Map> (Key: region, Value: top N trails)

Requirement 9: Difficulty Statistics

```
public Map getDifficultyStats()
```

Return Type: Map (Key: difficulty, Value: summary string)

UserInterface Class (Flow)

- 1 Enter number of trails.
- 2 Input each trail as 'trailId:name:region:difficulty:hikeCount'.
- 3 Split by ':' and call addTrailRecord().
- 4 Call getTrailById(). Print details or not-found message.
- 5 Call getMostHikedTrails(). Print each.
- 6 Call getHikeCountByRegion(). Print ': hikes'.
- 7 Call groupTrailsByDifficulty(). Print grouped lists.
- 8 Call updateHikeCount(trailId, additionalHikes). Print status and updated trail.
- 9 Call filterTrails(region, difficulty). Print results.
- 10 Call getTopTrailsByRegion(n). Print per-region lists.
- 11 Call getDifficultyStats(). Print ': count=..., totalHikes=..., averageHikes=...'.

Sample Input and Output 1

```
Enter the number of trails to be added
4
Enter trail details
T101:EverestBaseCamp:Himalayas:Hard:250
T102:ValleyOfFlowers:Himalayas:Moderate:180
T103:KumaraParvatha:Sahyadri:Hard:250
T104:MonumentValley:RockyMountains:Easy:120

Enter the Trail Id to check hike status
T103
T103 | KumaraParvatha | Sahyadri | Hard | 250 hikes

Most hiked trails are
T101 | EverestBaseCamp | Himalayas | Hard | 250 hikes
T103 | KumaraParvatha | Sahyadri | Hard | 250 hikes

Region-wise hike counts
Himalayas: 430 hikes
Sahyadri: 250 hikes
RockyMountains: 120 hikes

Trails grouped by difficulty
Easy
T104 | MonumentValley | RockyMountains | Easy | 120 hikes

Moderate
T102 | ValleyOfFlowers | Himalayas | Moderate | 180 hikes

Hard
T101 | EverestBaseCamp | Himalayas | Hard | 250 hikes
T103 | KumaraParvatha | Sahyadri | Hard | 250 hikes

Enter Trail Id to update hikes and additional hikes
T104 30
Updated T104 by 30 hikes
T104 | MonumentValley | RockyMountains | Easy | 150 hikes

Filter trails by region and difficulty
Himalayas Moderate
T102 | ValleyOfFlowers | Himalayas | Moderate | 180 hikes

Top 1 trails per region
Himalayas
T101 | EverestBaseCamp | Himalayas | Hard | 250 hikes
Sahyadri
T103 | KumaraParvatha | Sahyadri | Hard | 250 hikes
RockyMountains
T104 | MonumentValley | RockyMountains | Easy | 150 hikes

Difficulty statistics
Easy: count=1, totalHikes=150, averageHikes=150
Moderate: count=1, totalHikes=180, averageHikes=180
Hard: count=2, totalHikes=500, averageHikes=250
```

Sample Input and Output 2

Enter the number of trails to be added

5

Enter trail details

T201:Triund:Himalayas:Easy:90

T202:GrandCanyon:RockyMountains:Moderate:150

T203:ChadarTrek:Himalayas:Hard:70

T204:Roopkund:Himalayas:Hard:220

T205:Devkund:Sahyadri:Easy:85

Enter the Trail Id to check hike status

T999

Trail Id T999 not found

Most hiked trails are

T204 | Roopkund | Himalayas | Hard | 220 hikes

Region-wise hike counts

Himalayas: 380 hikes

RockyMountains: 150 hikes

Sahyadri: 85 hikes

Trails grouped by difficulty

Easy

T201 | Triund | Himalayas | Easy | 90 hikes

T205 | Devkund | Sahyadri | Easy | 85 hikes

Moderate

T202 | GrandCanyon | RockyMountains | Moderate | 150 hikes

Hard

T203 | ChadarTrek | Himalayas | Hard | 70 hikes

T204 | Roopkund | Himalayas | Hard | 220 hikes

Enter Trail Id to update hikes and additional hikes

T203 40

Updated T203 by 40 hikes

T203 | ChadarTrek | Himalayas | Hard | 110 hikes

Filter trails by region and difficulty

Himalayas Hard

T203 | ChadarTrek | Himalayas | Hard | 110 hikes

T204 | Roopkund | Himalayas | Hard | 220 hikes

Top 2 trails per region

Himalayas

T204 | Roopkund | Himalayas | Hard | 220 hikes

T201 | Triund | Himalayas | Easy | 90 hikes

RockyMountains

T202 | GrandCanyon | RockyMountains | Moderate | 150 hikes

Sahyadri

T205 | Devkund | Sahyadri | Easy | 85 hikes

Difficulty statistics

Easy: count=2, totalHikes=175, averageHikes=87

Moderate: count=1, totalHikes=150, averageHikes=150

Hard: count=2, totalHikes=330, averageHikes=165