



ITRO CONFERENCE

INFORMATION TECHNOLOGY AND EDUCATION DEVELOPMENT

Informacione tehnologije i razvoj obrazovanja



APPLICATION OF OOP IN MST ALGORITHMS

Mirjana Kocaleva Vitanova, Elena Karamazova Gelova, Zoran Zlatev, Stefan Micov
and Biljana Zlatanovska

Faculty of computer science, Goce Delcev University, Stip, Macedonia

ITRO conference 2026



INTRODUCTION

MST in graph theory

Used in networks, transport

OBJECTIVE

**Apply OOP
to MST**

**Improve
structure**



MST CONCEPT

Connect all nodes

No cycles

Minimum cost

KRUSKAL ALGORITHM

Sort

Sort edges

Add

Add smallest

Avoid

Avoid cycles

PRIM ALGORITHM

Start

Start from node

Expand

Expand tree

Use

Use priority queue



OOP PRINCIPLES

Encapsulation

Abstraction

Inheritance

Polymorphism



SYSTEM DESIGN

Vertex, Edge, Graph, Union-Find



KRUSKAL OOP

Graph + Edge + Union-Find



PRIM OOP

Adjacency list

Priority queue

CASE STUDY

Airline network

Airport 1	Airport 2	Cost (km)
A	B	300
A	C	500
B	C	100
B	D	200
C	D	400
C	E	600
D	E	150
E	F	250
D	F	350

RESULTS

Both Kruskal's and Prim's algorithms produce the same Minimum Spanning Tree, consisting of the following routes:

B–C (100 km)

D–E (150 km)

B–D (200 km)

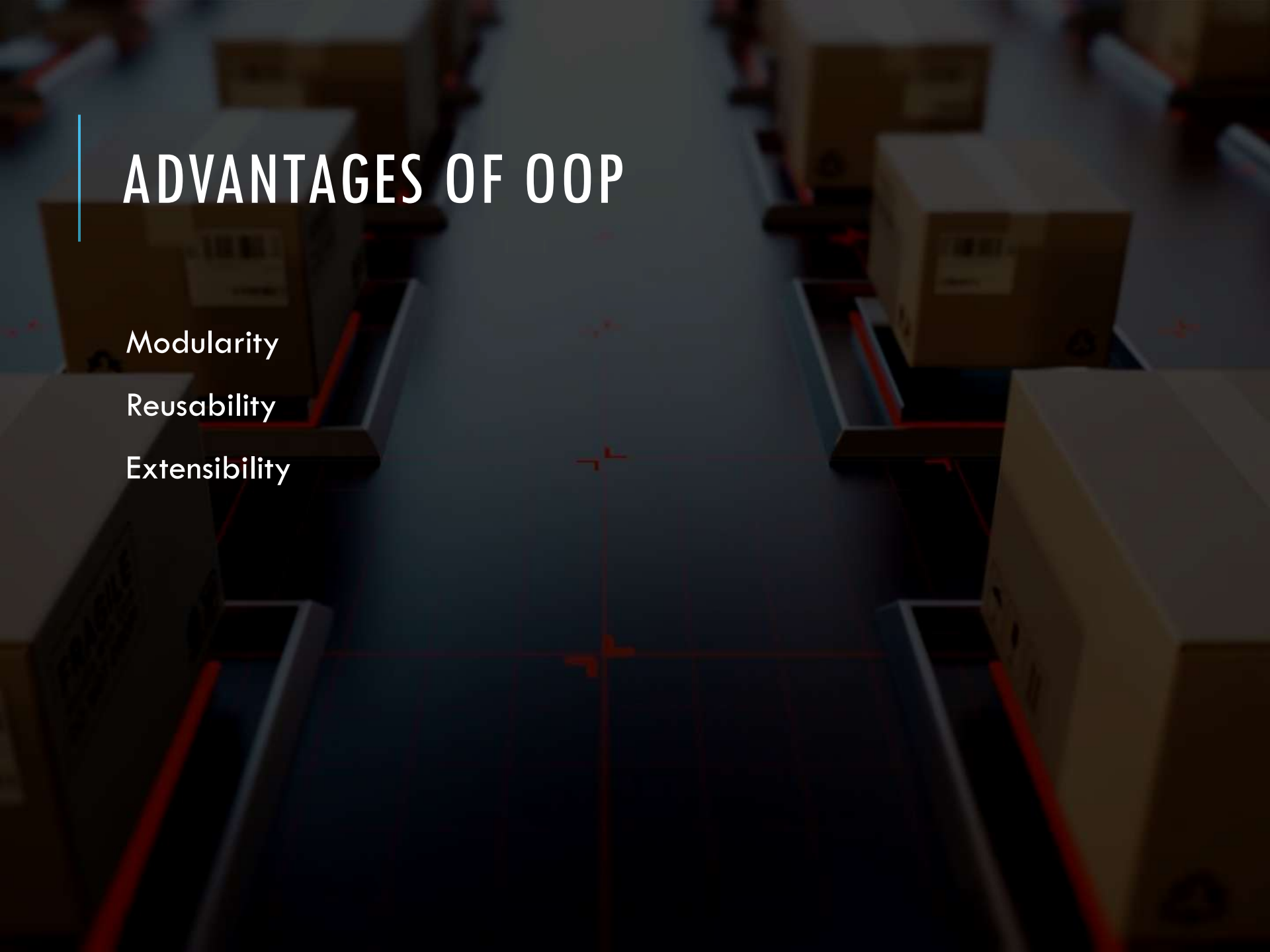
E–F (250 km)

A–B (300 km)

The total cost of the network is:

$$\begin{aligned}\text{Total cost} &= 100 + 150 + 200 + 250 + 300 \\ &= 1000 \text{ km}\end{aligned}$$





ADVANTAGES OF OOP

Modularity

Reusability

Extensibility

CONCLUSION

OOP improves MST

Real-world applicable

THANK YOU FOR
YOUR ATTENTION

