

CASE STUDY & PROBLEM STATEMENT

Title: Advanced C++ (Kaizen)



KPIT Technologies Ltd.

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Document Revision History

Version	Date	Author (s)	Reviewer (s)	Description
1.0	16 th August, 2019	Rajesh Sola		Initial draft
2.0				
3.0				

Contents

After assignment submission packages: 6

Module’s Learning Outcome: 6

Course work assignment details:..... **Error! Bookmark not defined.**

Evaluation Schema: **Error! Bookmark not defined.**

Assessment Type	Marks weightage to module	Submission deadline	Contribution
Open book case study	100%	As per mailer	Individual

Submission package:

- Source code for given problem statement
- Class diagram (Hand written / Generated by any UML tool)
- Considerations on problem solution (Embedded comments or any simple format)
- Optional – a small report on your C++ learning experience (Any simple format – simple text/Mark Down/Excel/Slides)
- Please zip the artifacts for mailing purpose.
- Optional – You can host your code in a git repo under gitlab.kpit.com, add developer access to module leader (Rajesh Sola).

Learning Outcomes:

Learning outcome	
O1	Applied Object Oriented concepts
O2	Effective & Clean coding practices of C++
O3	Usage of Modern C++ Features
O4	Code Quality Metrics
O5	Simple Test Driven Approach

Case Study Description

Part-I: OO Design

Analyze the problem statement and identify suitable classes and appropriate relationships between the classes.

Part-II: C++ Features

- a) Prepare a basic solution to meet all the expected functionality as per the given problem statement.
- b) Clean & effective coding paradigms
- c) Provide crisp logic, avoid redundant logic & length functions. Consider Single Responsibility Principle (SRP).
- d) Isolate console i/o, file operations from Business classes
- e) Use std algorithms wherever possible instead of your own iterator based logic

Part -III: Modern C++ Features

- a) Apply possible C++11 & 14 features. Here is a sample listing. You may consider maximum, if not all. You may add any other not listed also.
 - a. New additions on language basics, classes & objects, inheritance, templates etc.
 - b. Move semantics
 - c. Lambda expressions, std::function, std::bind
 - d. STL improvements in C++11/14
 - e. Smart pointers
 - f. Chrono library, Threading & IPC (If possible)

Part-IV: Code Quality Factors

- a. Adhere to code Style, for e.g. Google Style
- b. No violations from Static Analysis, e.g. cppcheck
- c. No memory leaks / Heap issues
- d. Meaningful names

Part-V: Simple Testing Strategy

- a. Suitable code in main to cover all functionality
- b. Basic asserts (if possible)

-----End of guidelines-----

Problem Statement:-

In this problem you are supposed to design a solution for Flight Management as described below. Let's not consider date & time of flight journey to make the problem simpler for now. Let's assume flight number is unique in entire database

- Design a class Flight as follows
 - Attributes
 - Flight number
 - Origin City
 - Destination city
 - Operator (AirIndia, Indigo etc)
 - Air Fare
 - Suitable constructor(s)
 - Any additional member functions as required
- Design another class to maintain Flight database
 - Use suitable container(s) to store all flight details
 - Constructor, Destructor if required
 - Operations
 - AddTrip with given attributes
 - RemoveTrip by flight number
 - Update air fare by flight number
 - Find flight details by number
 - Find all flights departing from a particular city
 - Find all flights by a specific operator
 - Find average air fare from all trips
 - Find minimum fare between two cities
 - Find maximum fare by a particular operator
 - Update the air fare for all flights by a specific operator, say decrease by 10%

A basic template is attached along with this code, you are free to use any other classes, global functions to meet the mentioned functionality and guidelines.

----- THANK YOU -----