

# Object-Oriented Programming and Design - Monsoon 2023

## Assignment 3 – Templates and Exception Handling

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This assignment carries a total of 60 marks. The components of the marks are separately given.

1. Suppose you are creating a library for the Indian Railways. The Railways specify that this library must have classes for (i) stations, (ii) lines, and (iii) platforms. Each station is associated with multiple lines, corresponding to a single platform. A single platform can only accommodate a train stoppage once every 30 minutes, whereas a through train can be accommodate once every 10 minutes. However, it is the user program that can enter the train timings. Design a library, such that the station's ID's may either be string or integer, depending on how the user program prefers. You need to design the class structure accordingly. You need to ensure that the principles of polymorphism and data hiding are followed in the library, and that incorrect information coming from the user program is not accepted.
2. Write a test user program to test the above library, to show that both correct data is accepted, and incorrect data is rejected. You are free to use any data structure that the C++ library provides.

### Grade Components

1. Design of class structure – 10
2. Proper functioning of each class – 15 (3 x 5)
3. Use of templates and data structure – 10 (5 + 5)
4. Working of user program (with user input) and print functions – 10
5. Proper use of exception handling – 10
6. Additional cases of code cleanliness, such as use of Makefile (both for building library and test program), git commits and proper function/variable names – 5

### What and How To Submit

- The C++ program sources. Assert, templates and exception handling must be utilized.

- **Makefile** to compile the sources and generate the running binary for the shell. The Makefile should generate two versions of the binary – one for debugging and another for optimized execution.
- A readme text file, explaining the commands needed to build the file, and the format of the input files. If code is copied from anywhere else (not that copying from any other student is plagiarism, but using textbook or open-source code is allowed), that should be mentioned here.
- At least 4 significant commits on a **private** github repository, with proper descriptions of the commits. You may have as many commits as you wish.
- Make the assigned TA the admin of the github repository, **and** submit the same code in zipped form on Google Classroom by the due date.

### Late Submission Policy

- -0.25 per hour for the first 96 hours.
- Submissions beyond 4 days of delay would only be accepted with official leaves of absence.