Assignment no - 12

Title - Template design pattern and exception handling in Java.

Problem statement - Write a program on template and exception handling in Java in this assignment multiple templates are to be designed as a pattern and these patterns to be used to take decisions

Objective - ① To understand and use concept of template design pattern

② To understand concept and importance of exception handling in java

③ To learn use of multistreple templates as pattern to take decision.

Outcome - ① To be able to implement multiple template in Java.

② To be able to implement exception han

Theory -

Template Method Design Pattern.

Design patterns are the best practices used experienced object oriented software developers. These design patterns are solutions to general problems that software developers faced during software development. There are total 23 design patterns

Templates means present format like HTML templates which has fixed present format. Similarly in template method pattern a preset structure method called template method which consists of steps. Thus template method defines algorithm but exact steps can be defined in subclasses.

Components-

Abstract class - It defines template method defining the structure of algorithm and it also defines abstract operation that will be implemented by subclasses to define steps of algorithm.

Concrete class - It implements abstract operation of super class to carry out subclass specific steps of the algorithm and also overrides operation if default behaviour is not required.

Exception handling -

An exception is a error condition that changes the normal flow of control in a program. Exception is an object which is thrown at runtime. Exception handling in java is one of the important mechanism to handle the runtime errors so that normal flow of the application can be maintained.

An exception can occur for many different reasons

① An user has entered invalid data
② A file that needs to be opened cannot be found
③ A network connection has been lost in the middle of communication or the JVM has run out of memory.

There are three types of exceptions

① Checked Exception
The classes that extend Throwable class except Runtime Exception and error are known as checked exception eg. IOException, SQLException.

② Unchecked Exception-
The classes that extend RuntimeException are known as unchecked exceptions eg Arithmatic exception, NULLPointerException

③ Error-
Error is irrecovrable eg OutofMemoryError, VirtualMachineError, etc

There are 5 ~~types~~ keywords used in java exception handling
① try
② catch
③ finally
④ throw
⑤ throws

Algorithm

Template Method Design Pattern

① Define abstract class with template method consists of abstract methods and common methods
② common implementations of individual steps are defined in base class
③ Override or implement specific step to sub class
④ Template method in super class should not be overriden so make it final

Syntax of exception handling

```
try
{
   // statement that can cause exceptions
}
catch (Exception e)
{
   // statement to be displayed after calculating the
   //exception
}
```

Conclusion -

We successfully implemented the assignment and understood the concept of template design pattern and exception handling in java.