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## **HW to Chapter 9 (Non-programming Assignment)**

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1) What is class constructor and why is it needed?

- A class constructor is a special method that is automatically called when an object of the class is created. It has the same name as the class and doesn't have a return type. The purpose of a constructor is to initialize the state of an object.
- Constructors are crucial for ensuring that an object starts with a valid state and is ready for use. They provide a way to set initial values for the attributes of an object.

### **Example:**

```
// Main class
public class Main {
    int x;

    // Class constructor for the Main class
    public Main() {
        x = 3;
    }

    public static void main(String[] args) {
        Main myObj = new Main(); //Creating an object and Calling the constructor
        System.out.println(myObj.x); // Outputs 3
    }
}
```

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2) What is the meaning of the following access modifiers: “public”, “private”, “protected”, and “default”?

Access modifiers control the visibility of class members

- **Public:** Members (methods, fields, classes) declared as public are accessible from any other class.

- **Private:** Members declared as private are only accessible within the same class. They are not accessible from outside the class, including subclasses.
- **Protected:** Members declared as protected are accessible within the same class, within the same package, and by subclasses. They are not accessible from outside the package.
- **Default (Package-Private):** If no access modifier is specified, the default access level is package-private. Members with default access are accessible within the same package but not from outside the package.

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3) What is the meaning of the following non-access modifiers: “final” and “abstract”?

Non-access modifiers define additional properties or constraints on classes and methods

- **Final:** When applied to a class, method, or variable, it indicates that it cannot be extended (for classes), overridden (for methods), or reassigned (for variables).
- **Abstract:** Applied to a class or method, it indicates that the class cannot be instantiated directly (for classes) or that the method has no implementation and must be implemented by a subclass (for methods).

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4) What is a Java package?

- A Java package is a way to organize related classes and interfaces into a single namespace. It helps in avoiding naming conflicts and provides a modular structure to the code.
- Packages are used to group related classes, interfaces, and sub-packages together. They help in organizing code, improving code readability, and managing the complexity of large software projects.
- The syntax for declaring a package in Java is by using the ‘package’ keyword, and the convention is to use reverse domain notation.
- Example: edu.neu.mgen, to ensure uniqueness.