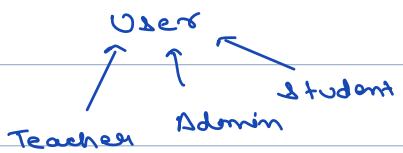
× not

Agenda :- Simple factory
factory method
Abstract factory.

creational

```java
class Student extends User {
    public Student(String firstName, String lastName) {
        super(firstName, lastName);
    }
    // Student-specific methods
}

class Teacher extends User {
    public Teacher(String firstName, String lastName) {
        super(firstName, lastName);
    }
    // Teacher-specific methods
}

class Admin extends User {
    public Admin(String firstName, String lastName) {
        super(firstName, lastName);
    }
    // Admin-specific methods
}
```




```java
// In the client code
public class Client {
    public static void main(String[] args) {
        User user;
        String userType = getUserTypeFromInput(); // This could be from user input,

        if (userType.equals("student")) {
            user = new Student("John", "Doe");
        } else if (userType.equals("teacher")) {
            user = new Teacher("John", "Doe");
        } else if (userType.equals("admin")) {
            user = new Admin("John", "Doe");
        } else {
            throw new IllegalArgumentException("Invalid user type");
        }

        // Use the created user object
    }
}
```

API, bg job.

Object creation could be complex.

1. Coupling two classes
2. OCP principle — we are breaking these..
3. Duplication → is hard to update — if want to add more then.. we will have to add more if else condn.
4. SRP principle — Object creation may be tough.. this may call some api , db.

① Simple factory.

```
class UserFactory {
  public static User createUser(UserRole role) {
    switch (role) {
      case STUDENT:
        return new Student("John", "Doe");
      case TEACHER:
        return new Teacher("John", "Doe");
      case ADMIN:
        return new Admin("John", "Doe");
    }
  }
}
```

I/P

Enum
↳ — Student,
— . Teacher
— . Admin.
—

This is violating only ocp because whenever we h

client

↳ User user = UserFactory.createUser
(userType. —);

I/O

WebService {

Database db = ——— (mysql, mongodb, fakeDB)

createWeb() {

if (db is inst of MySQL) {
| Query q = mySQLQuery();
else if (db is mongodb) {
| Query q = mongodbQuery();
}
.
.
.

db.execute(q);
}

class QueryFactory {

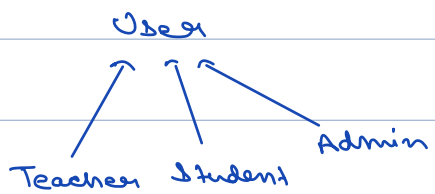
——— (List v) {

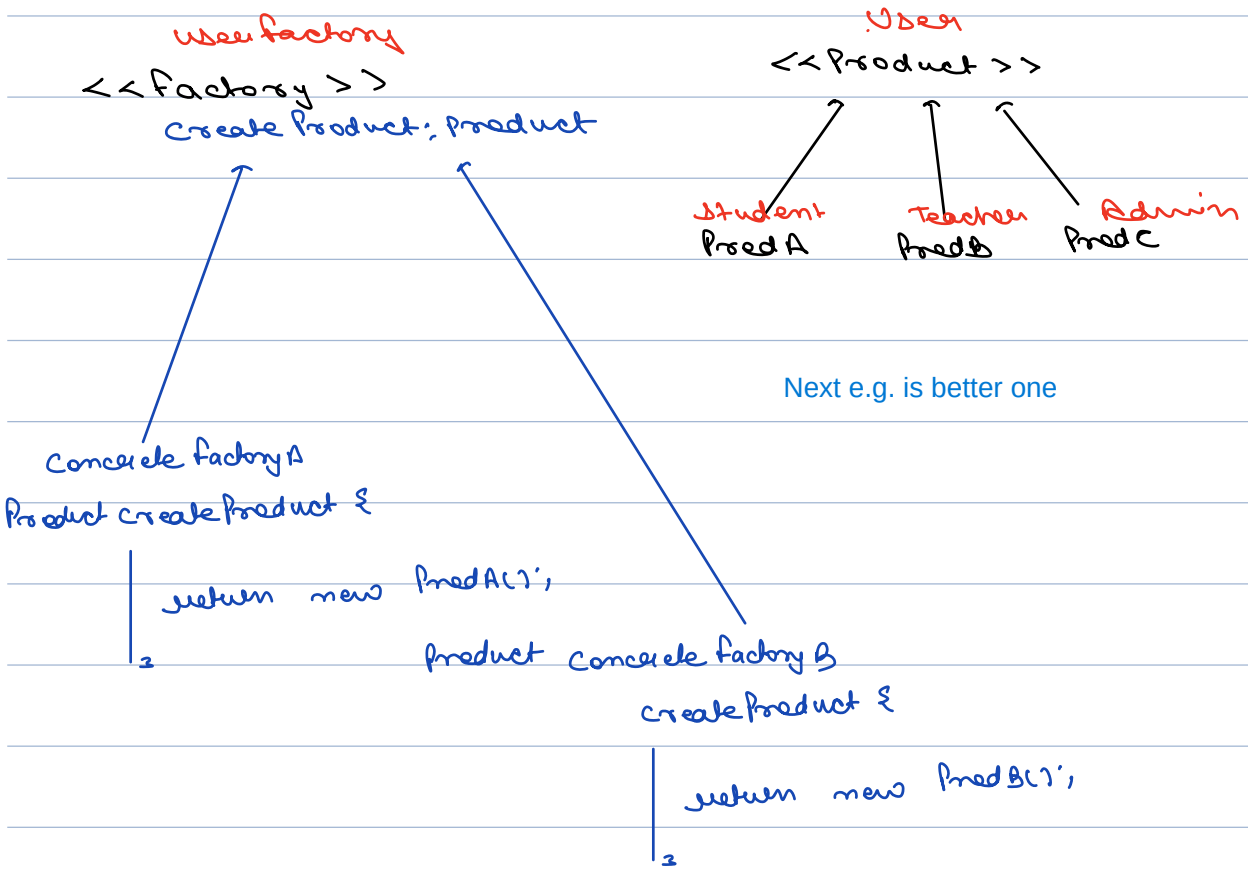
for —
switch (mysql) {
return mySQLQuery();
}
}

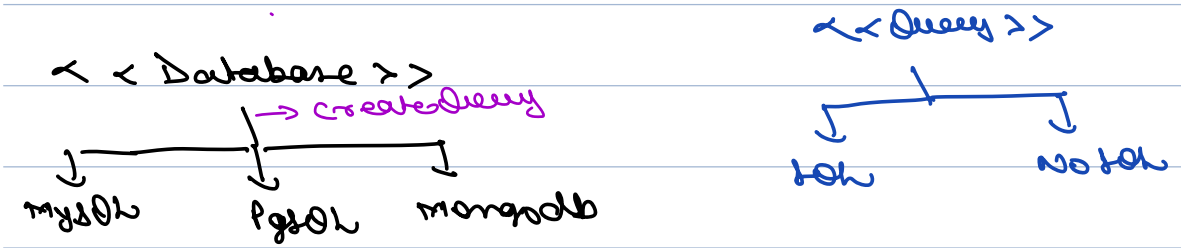
2) Factory method pattern:-

```
class UserFactory {
  public static User createUser(UserRole role) {
    switch (role) {
      case STUDENT:
        return new Student("John", "Doe");
    case TEACHER:
      return new Teacher("John", "Doe");
    case ADMIN:
      return new Admin("John", "Doe");
    }
  }
}
```

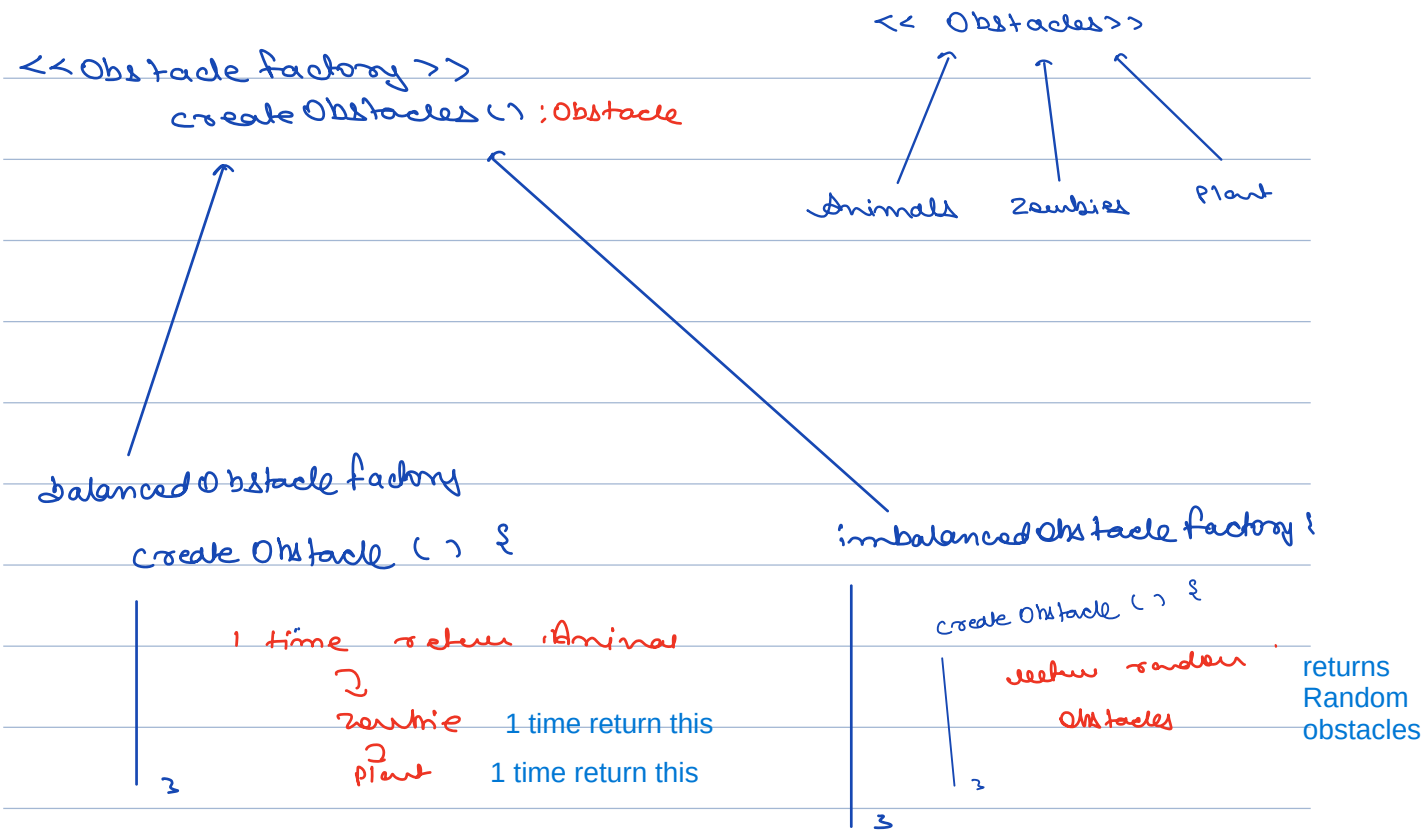
OCP

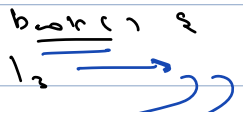


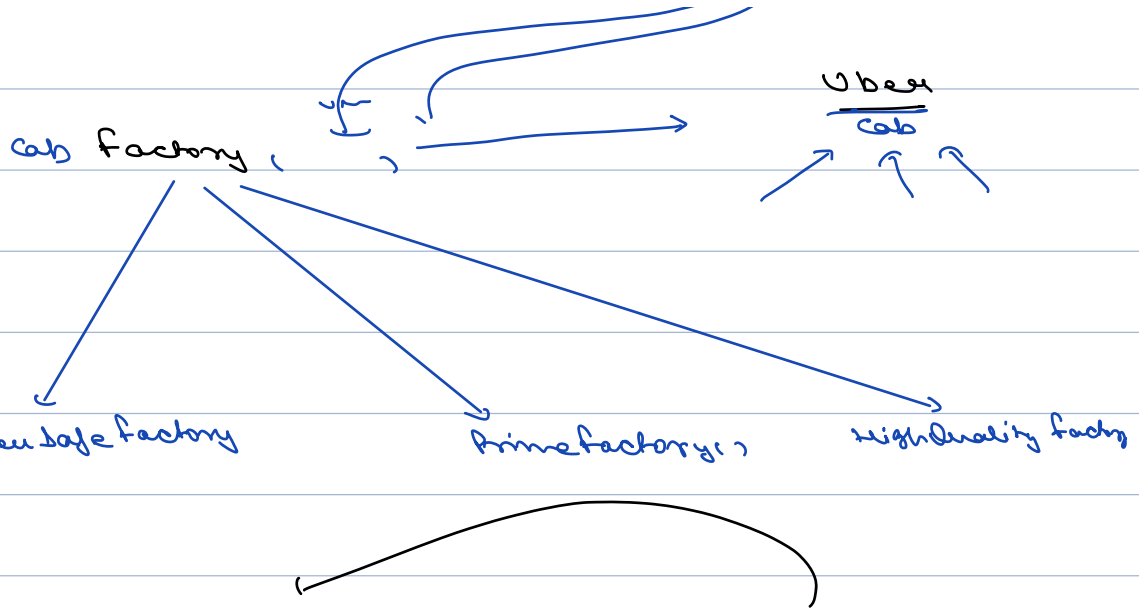

User factory
<<Factory>>
Create Product: Product
User
<<Product>>
Student
Prod A
Teacher
Prod B
Admin
Prod C
Next e.g. is better one
Concrete factory A
Product createProduct {
return new ProdA();
}
Product Concrete factory B
createProduct {
return new ProdB();
}


<<Database>>
createQuery
MySQL
PgSQL
MongoDB
<<Query>>
SQL
NoSQL

Video Game


<< Obstacles >>
Animals
Zombies
Plant
<< Obstacle factory >>
createObstacles() : Obstacle
BalancedObstacleFactory
createObstacle() {
1 time return Animal
Zombie
1 time return this
Plant
1 time return this
}
ImbalancedObstacleFactory {
createObstacle() {
return random
Obstacles
}
returns
Random
obstacles

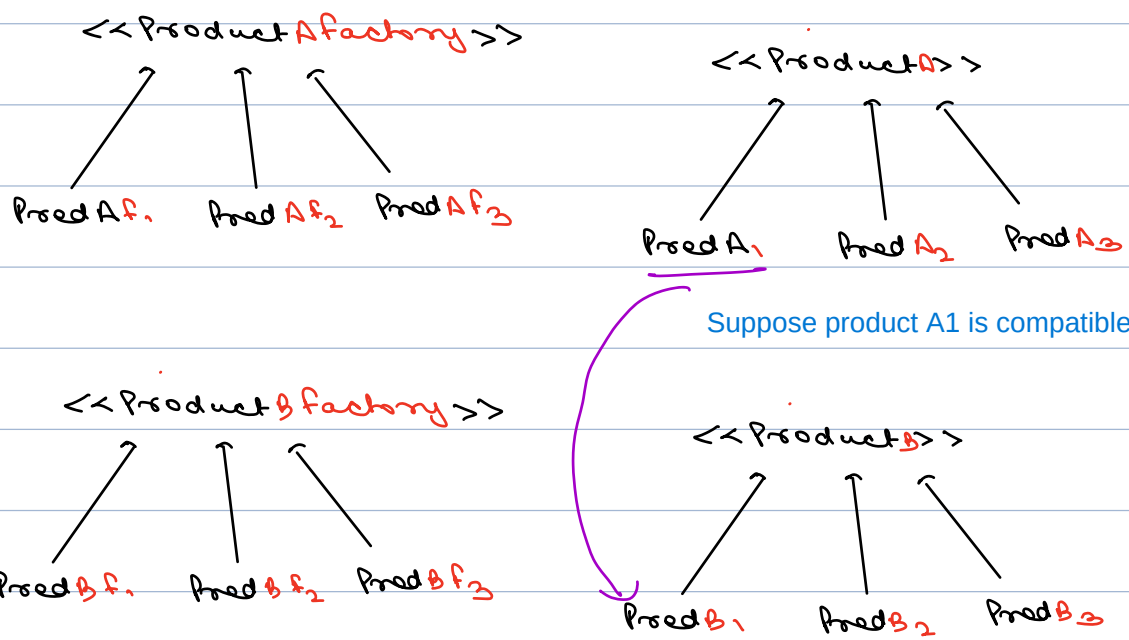




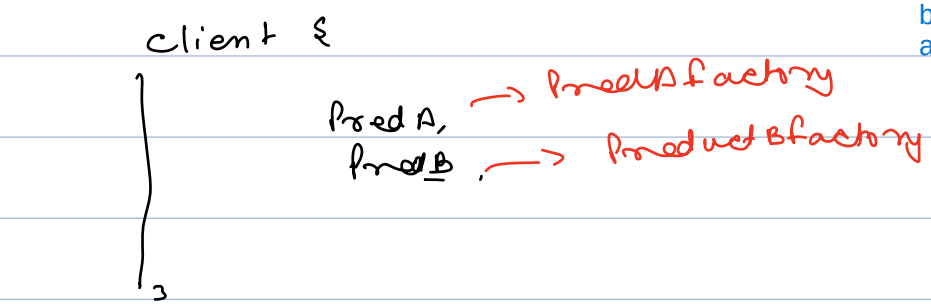

```
Cab c = CabFactory.getCab(User, Time);
```

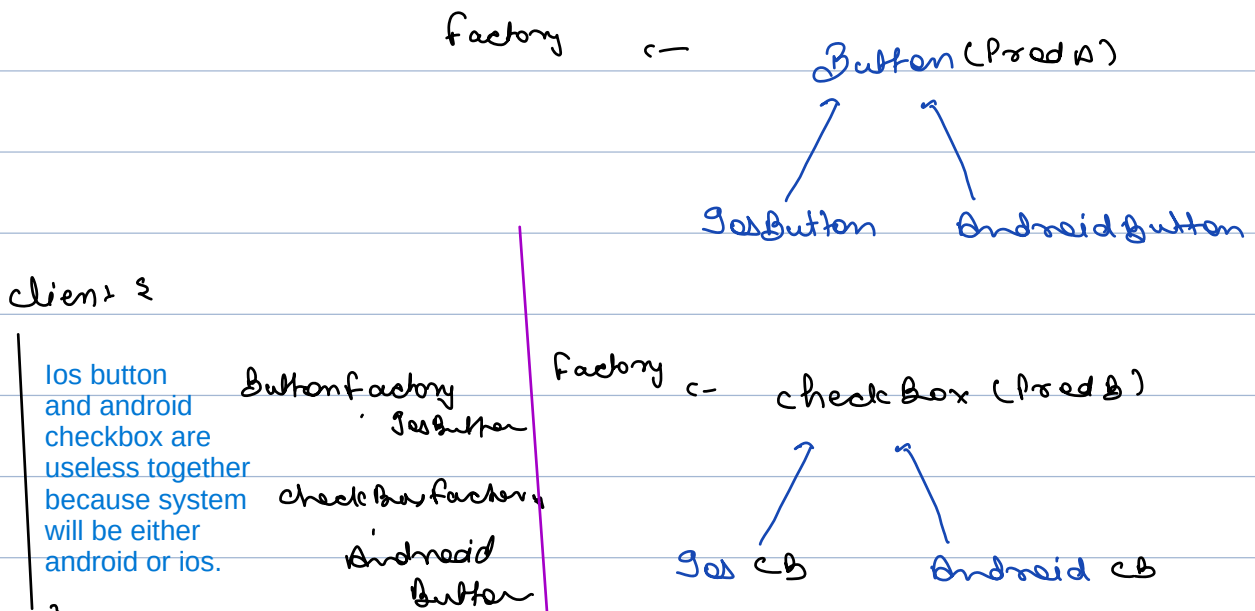
⑥ Abstract factory

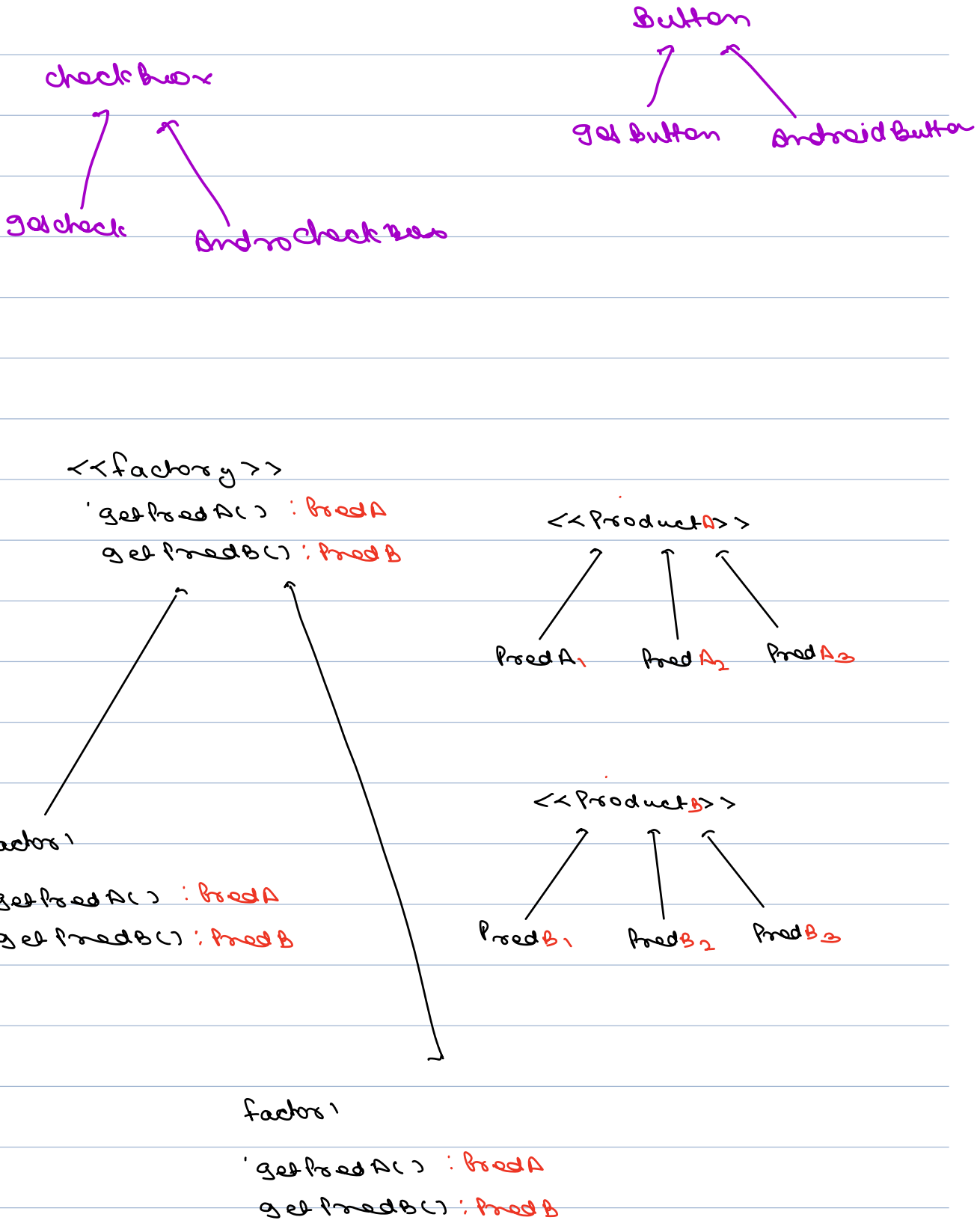
factory of factories

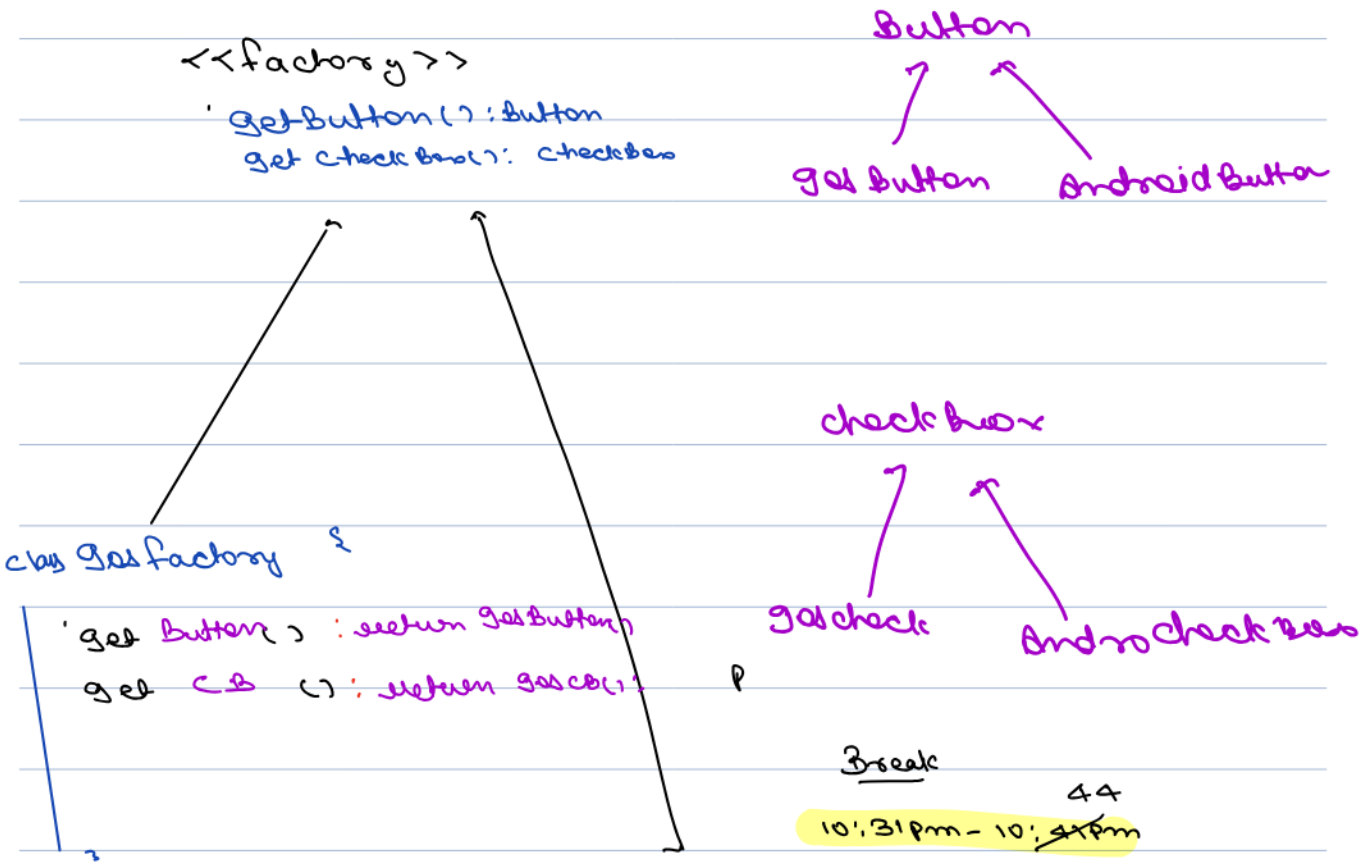


User can call any method here.. e.g. ProductA1 and ProductB2
but we know both are not good if they are together.. checkout next e.g.






Button
GetButton
AndroidButton
CheckBox
GetCheck
AndroCheckBox
<<factory>>
'getProdA() : ProdA
getProdB() : ProdB
<<ProductA>>
ProdA1
ProdA2
ProdA3
<<ProductB>>
ProdB1
ProdB2
ProdB3
factory1
'getProdA() : ProdA
getProdB() : ProdB
factory1
'getProdA() : ProdA
getProdB() : ProdB



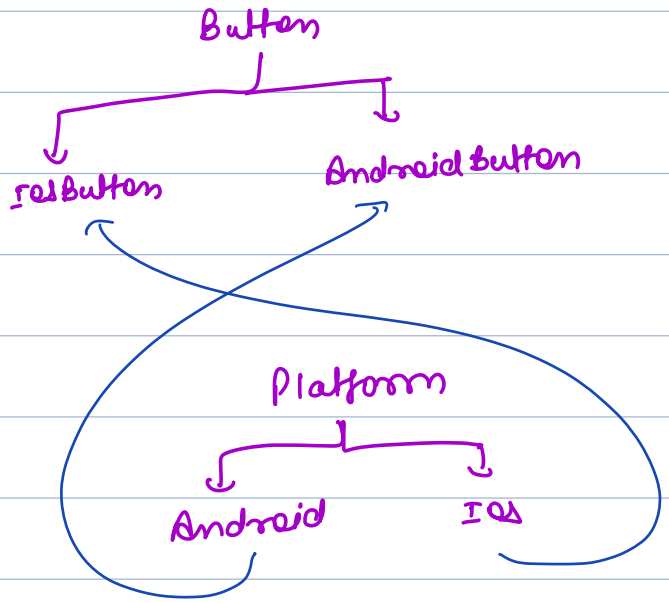

```
class StudentFactory {
  public User createStudent(String firstName, String lastName) {
    return new Student(firstName, lastName);
  }
}
class TeacherFactory {
  public User createTeacher(String firstName, String lastName) {
    return new Teacher(firstName, lastName);
  }
}
```

```
abstract class ClassroomFactory {
  public abstract Student createStudent(String firstName, String lastName);
  public abstract Teacher createTeacher(String firstName, String lastName);
}
```

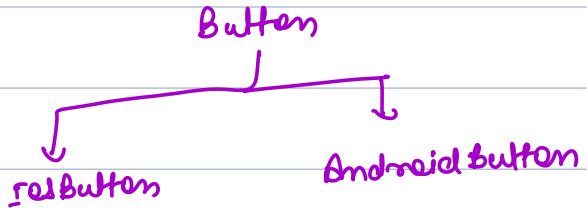
```
 class BiologyClassroomFactory extends ClassroomFactory {
   @Override
   public Student createStudent(String firstName, String lastName) {
     return new BiologyStudent(firstName, lastName);
   }

   @Override
   public Teacher createTeacher(String firstName, String lastName) {
     return new BiologyTeacher(firstName, lastName);
   }
 }
```

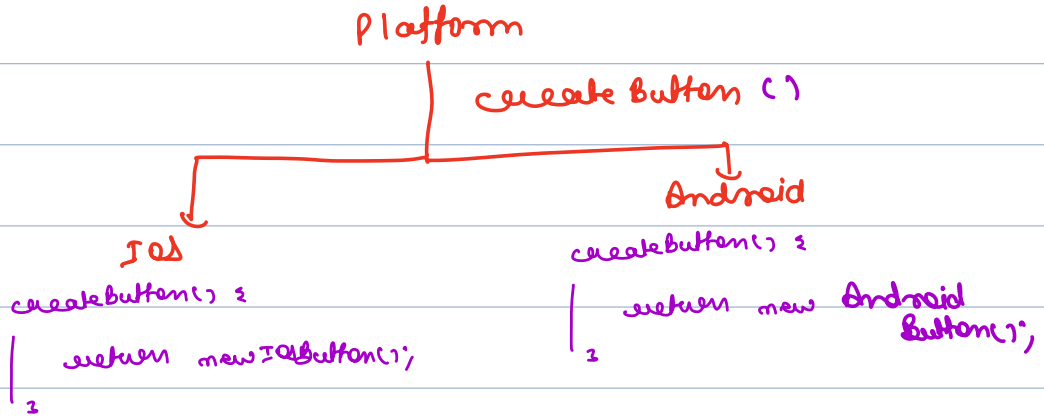
```
ClassroomFactory factory = new BiologyClassroomFactory();
Student student = factory.createStudent("John", "Doe");
Teacher teacher = factory.createTeacher("John", "Doe");
```

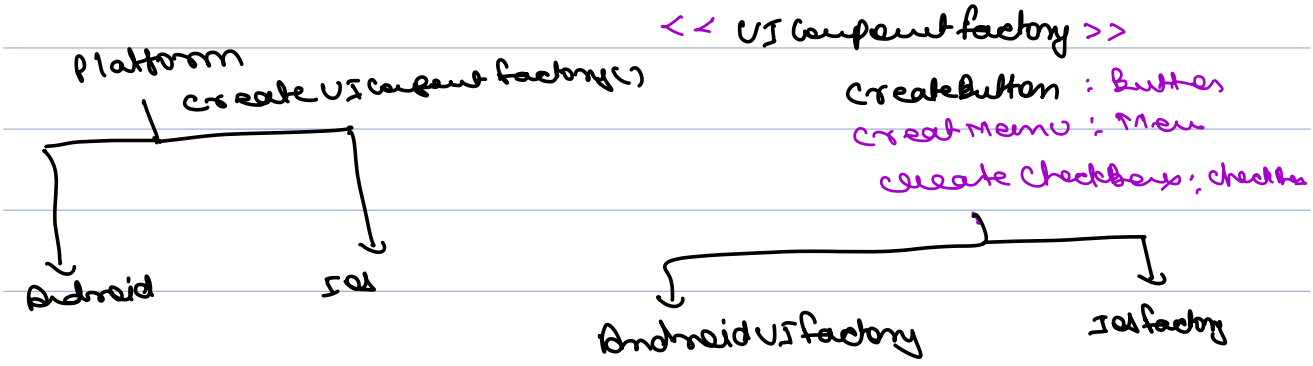
Flutter / React Native : cross platform UI.

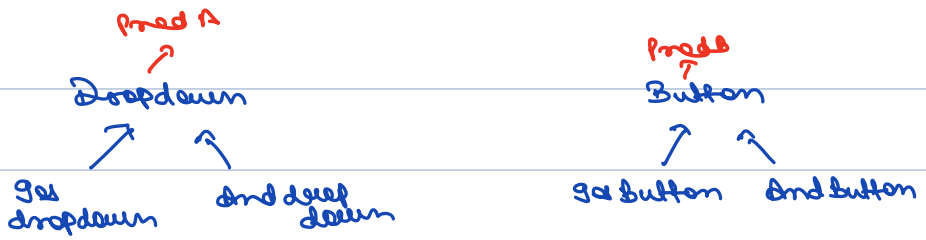


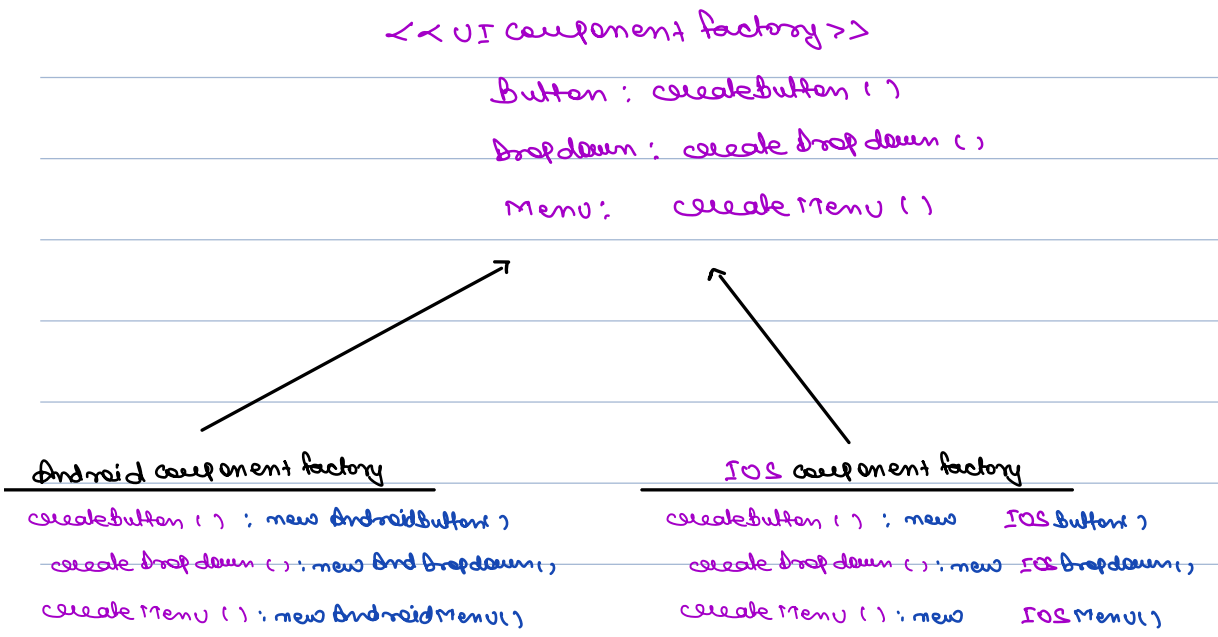

```
createButton() {
    if (Platform == IOS) {
        Button b = new IOSButton();
    } else {
        ——
    }
}
```

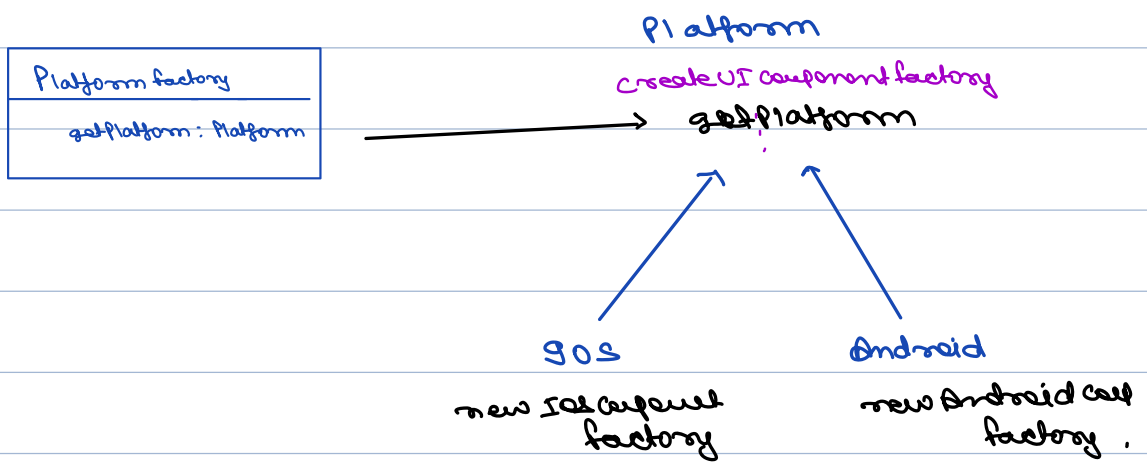

Button
IOSButton
AndroidButton


Platform
createButton()
IOS
createButton() {
return new IOSButton();
}
Android
createButton() {
return new AndroidButton();
}


Platform
createUIComponentFactory()
Android
IOS
<< UIComponentFactory >>
createButton : Button
createMenu : Menu
createCheckbox : Checkbox
AndroidUIFactory
IOSFactory


Prod A
Dropdown
IOS dropdown
And drop down
Prod B
Button
IOS Button
And Button


<< UI component factory >>
Button : createButton ( )
Dropdown : create Dropdown ( )
Menu : create Menu ( )
Android component factory
createButton ( ) : new AndroidButton ( )
create Dropdown ( ) : new AndDropdown ( )
create Menu ( ) : new AndroidMenu ( )
IOS component factory
createButton ( ) : new IOSButton ( )
create Dropdown ( ) : new IOSDropdown ( )
create Menu ( ) : new IOSMenu ( )


Platform factory
getPlatform : Platform
Platform
createUI component factory
getPlatform
IOS
new IOS component factory
Android
new Android component factory