

OBJECTS AND CLASSES

BY

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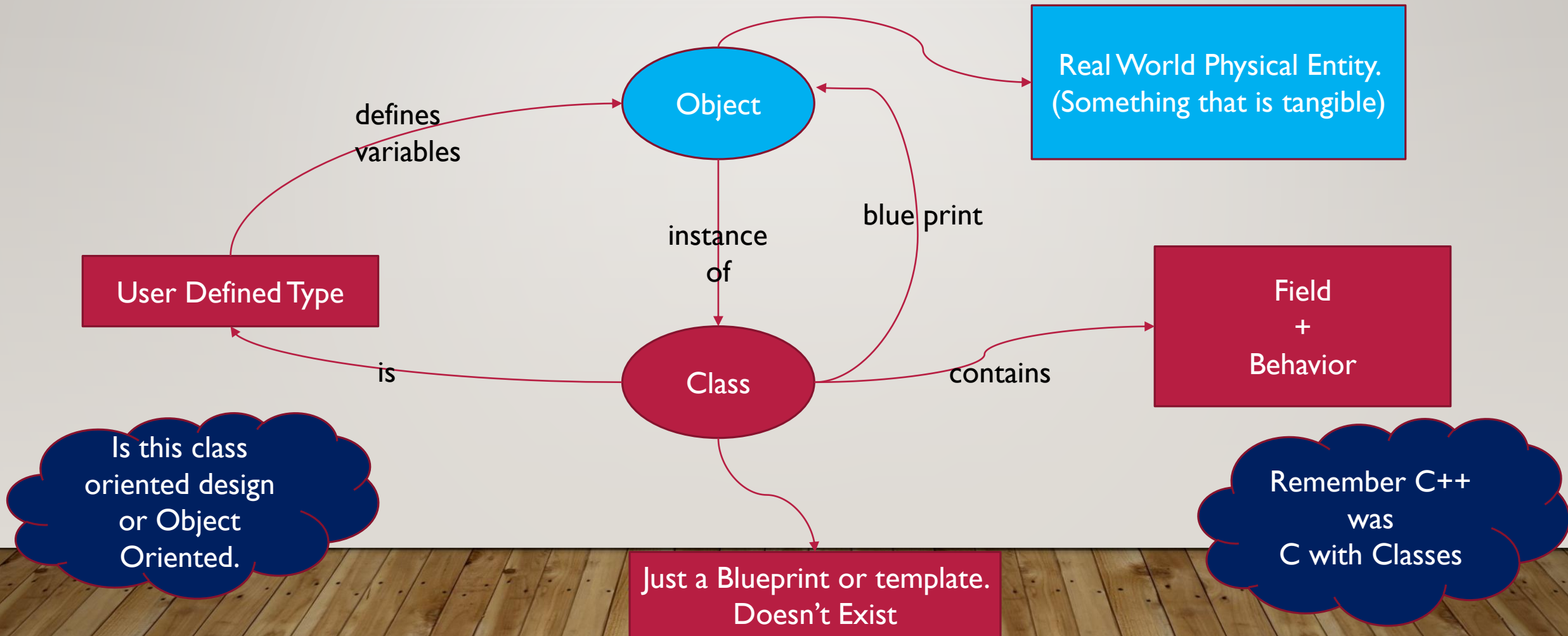
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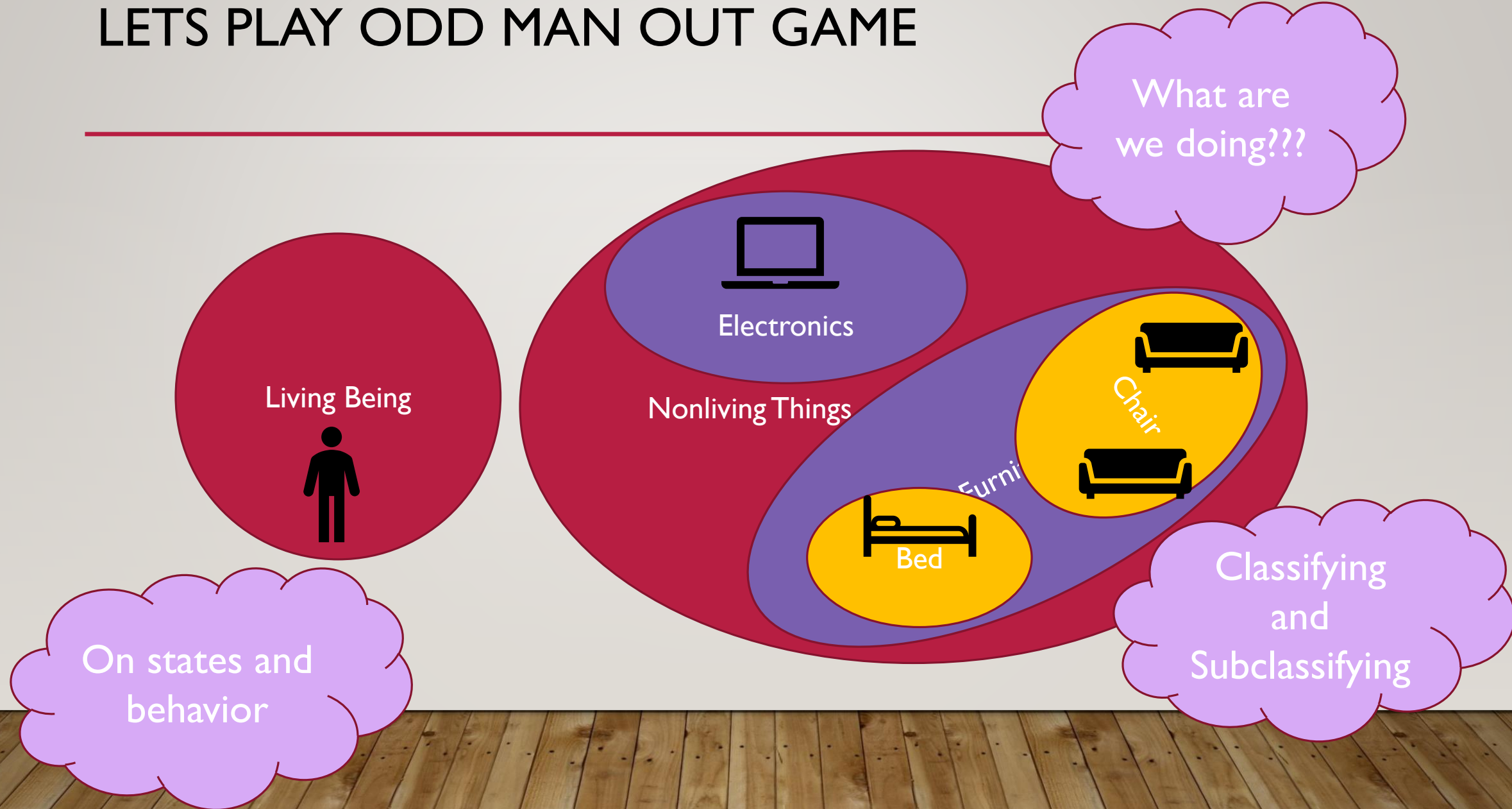
WHAT IS PROGRAMMING?

- Traditional Definition
 - A Set of Instruction given to computer to get an Output

WHAT IS AN OBJECT (POPULAR VIEW)



LETS PLAY ODD MAN OUT GAME



WHAT IS A CLASS?

- Class → Classification
- Basic of Classification
 - Properties
 - Behavior

LETS DESCRIBE AN OBJECT

- Imagine A new to be launched Bike, whose brochures are yet to be released.
- What question would you ask about the technical specification of this bike?
 - Mileage
 - CC
 - BHP
 - Break?
- How do you know What questions to ask?
 - Experience with Other Bikes
- Do you know about Dinosaur?
 - How do you know?

WHAT COMES FIRST – OBJECT OR CLASS?

- Remember the Odd man out game. You defined classes
 - Living Being, Non Living thing, Furniture, Electronics, Table Chair etc
 - Before seeing the Object or after seeing the Object
- Do you realize when discussing the specification for Bike you were actually defining a class?
 - What was the source of this information?
- Contradiction
 - Those classes existed.
 - They aren't created at this Rectangle.

ODD MAN OUT ROUND 4

Car.
Others are
Animal



ODD MAN OUT ROUND 5

Objects are same
but class changed

Tiger
Others are
Transport



ODD MAN OUT ROUND 5

Classification is a
dynamic idea!!!
Class is static

Dog is Domestic

Deer
is
not carnivore

Crocodile is Reptile



DEFINE CLASS EMPLOYEE

- Name
- Id
- Salary
- Work

DEFINE CLASS DEPARTMENT

- Name
- Department Head
- Employees
- Job
- Budget

DEFINE CLASS FOOO

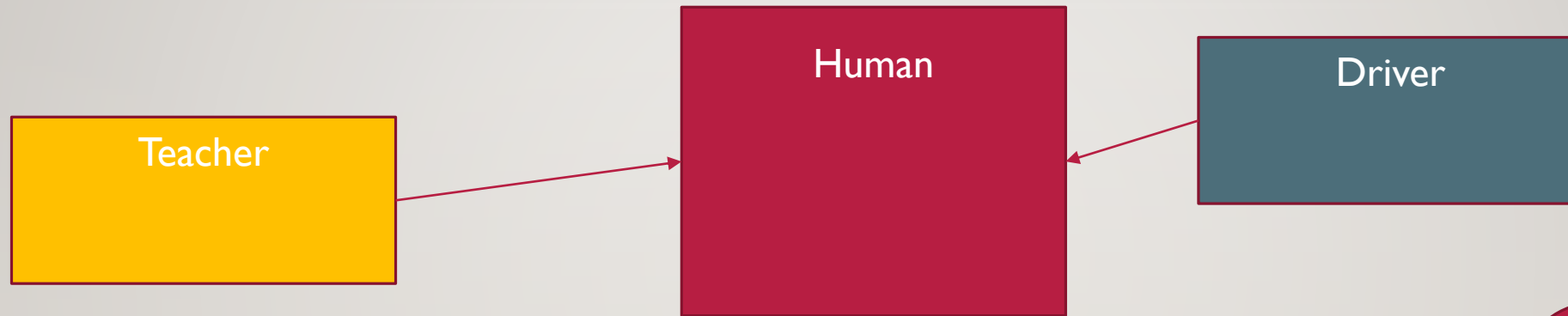
- Think How you managed to create class Employee and Department But Not Fooo?
- You know Object Employee and Department But Not Fooo
- You can create classes only when you know the Object

TAKEAWAY

- Its Always Object (that and should) Come First
- Class may not come even second
 - Conceptually needed for classification only
 - Not Present in Language like Java Script
- Semantical compulsion in main stream OO langauges C++, Java & C#
- Is also an inconvenience
 - Static and compile time.
 - Design becomes **class oriented**.

OBJECT AND CLASS

Problem with class First Approach!!!



Eat()
Sleep()
Move()



Vivek

Teach()
Drive()

So Is Vivek a Trainer or Driver???

Do you know He was neither Trainer nor driver when Born



Prabhat

Not Every Human Teaches?

LETS CREATE SOME MORE CLASS



```
class MagicWand{  
    int length;  
    Core core;  
    Owner owner;  
    public void CastSpell(MagicSpell spell){  
  
    }  
}
```



WHAT IS A MAGIC SPELL

Avada Kedavra
Expelliarmus Bombarda
Crucio Aparecium
Expecto Patronum
Sectumsempra Incendio
Riddikulus Lumos
Episkey Duro Nox
Reducto Relashio
Stupefy Fidelius
Wingardium Leviosa Engorgio

```
class MagicSpell{  
    String phrase;  
    boolean isLegal;  
  
    public void effect(){  
  
    }  
}
```

SO WHAT AN OBJECT IS NOT

- Object is not an instance of class
 - Object comes before class
- Object may not be a real world or physical entity
 - Object May be real-world physical
 - Employee
 - Object May be real-world not physical
 - Department
 - Object May be physical but not real world
 - Magic Wand
 - Object May be neither real world nor physical
 - Magic Spell

SO WHAT IS AN OBJECT

- Object is a Domain Entity
- Domain is the Problem Space
- Everything in the domain is an Object
 - Physical
 - Non-Physical
- Anything that you can visualize is an Object
- Think
 - Even a blueprint is an Object
 - That Means a class can also be considered as an object

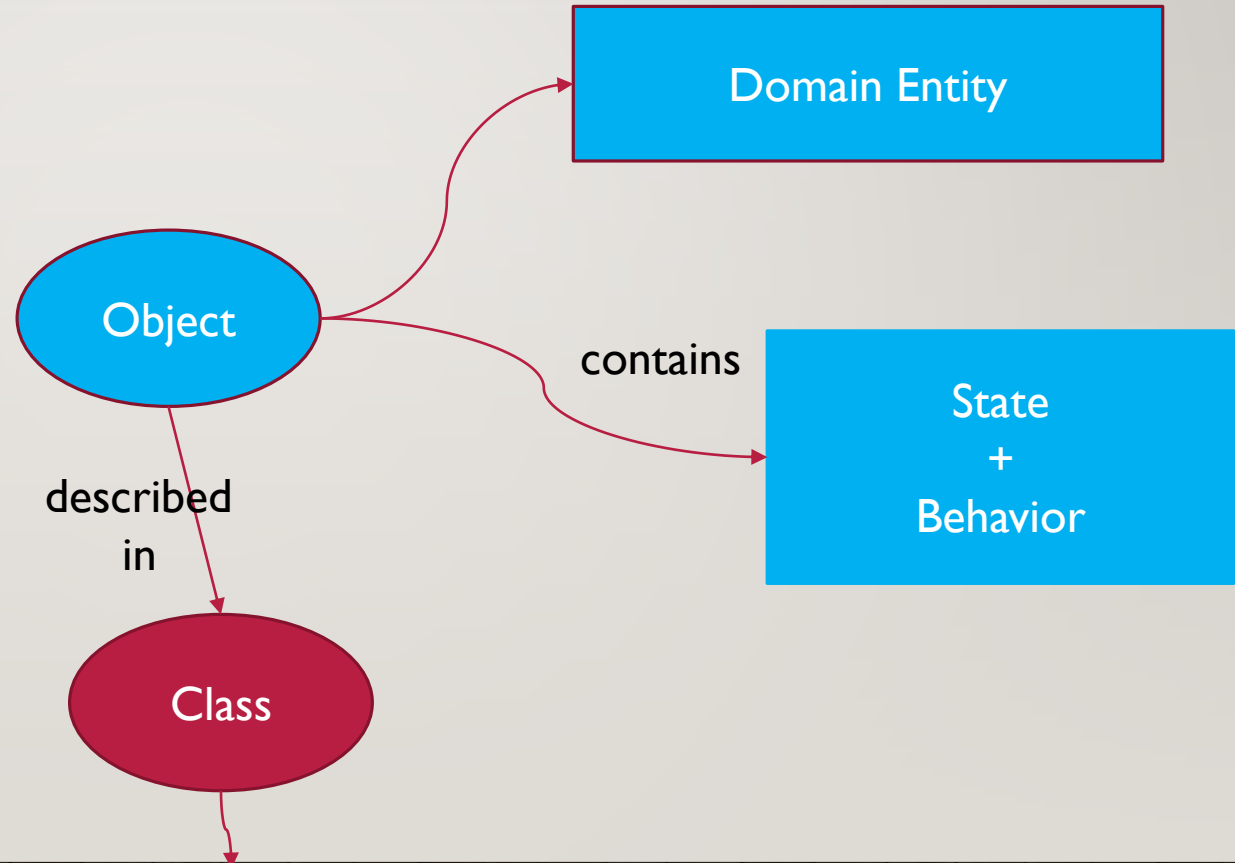
OBJECT AND CLASS

- Object Exists
- Object comes first
- Object Contains State and Behavior
- Object Defines Class
 - Why?
- Class exists to describe **an object**
- Class is Not a user defined type
 - Predefined types are existing classes
 - int is an Object

WHAT IS AN OBJECT (REDEFINED)

Class is not
optional in
C++/Java/C#

But we can start
thinking in terms
of Object.



Just a Blueprint or template.
Doesn't Exist

WHAT AN OBJECT HAS?

1. Responsibility (Behavior)

- Object has a purpose of Existence
- Known as Behavior

2. Structure (State)

- Capabilities to carry out its behaviour
- To do great jobs they are blessed with tools to do it

3. Identity

- Objects maps to a domain entity
- Each Object in memory should 1:1 match with an entity in domain
- Each Object Must be uniquely identifiable
- E.g. Harry Potters wand is distinct from the wand of He who must not be named.

Together Referred as
the SBI of an Object.

RECTANGLE SBI

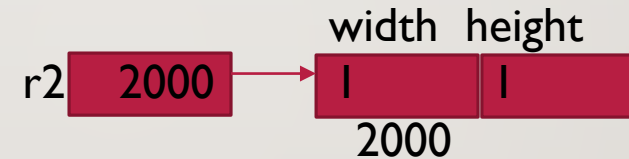
Object Matters, Reference
Doesn't

Rectangle r1=new Rectangle (3,4);



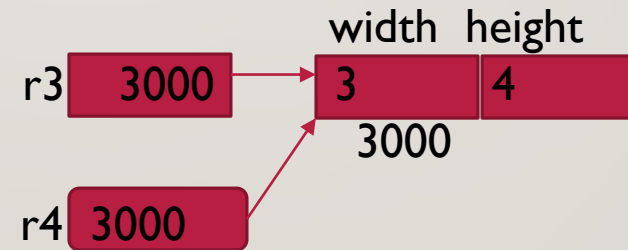
R1 != R2
R2!=R3

Rectangle r2=new Rectangle (1,1);



R3 == R4
True/False?

Rectangle r3=new Rectangle (3,4);
Rectangle r4=r3;



R1 == R3
True/False?

POINT SBI

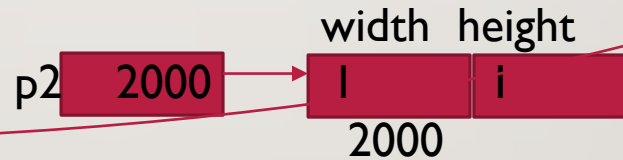
Object Matters, Reference
Doesn't

Point p1=new Point (3,4);



p1 != p2
p2 != p3

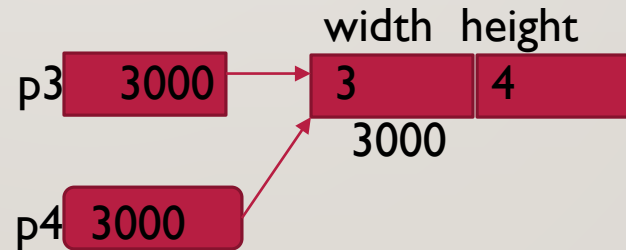
Point p2=new Point (1,1);



p3 == p4

Point p3=new Point (3,4);

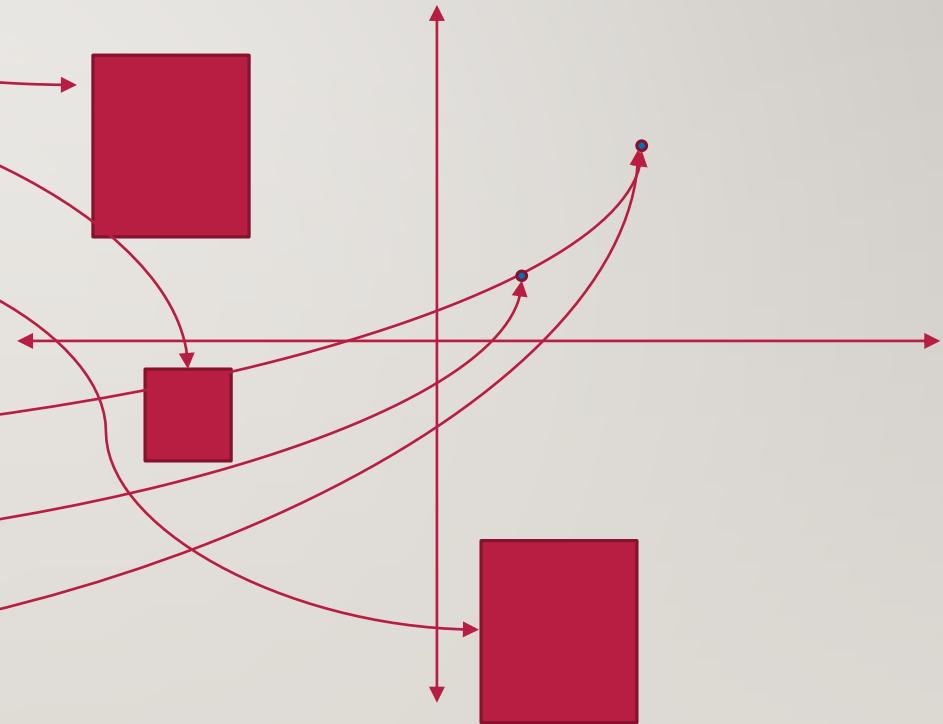
Point p4=p3;



p1 == p3
True/False?

OBJECTS EXISTS IN DOMAIN (NOT IN MEMORY)

- Rectangle r1=new Rectangle(3,4);
- Rectangle r2=new Rectangle(1,1);
- Rectangle r3=new Rectangle(3,4);
- Point p1=new Point(3,4);
- Point p2=new Point(1,1);
- Point p3=new Point(3,4);



Where
should we
plot p3?

Domain Matters Not
Memory.

BANK ACCOUNTS

x 1000

a	b
1	1000

y 2000

a	b
2	1000

z 3000

a	b
1	2000

//10:00AM

BankAccount x=new BankAccount(1);

//10:01AM

BankAccount y= new BankAccount(2);

//10:02 AM

BankAccount z=new BankAccount(1);