

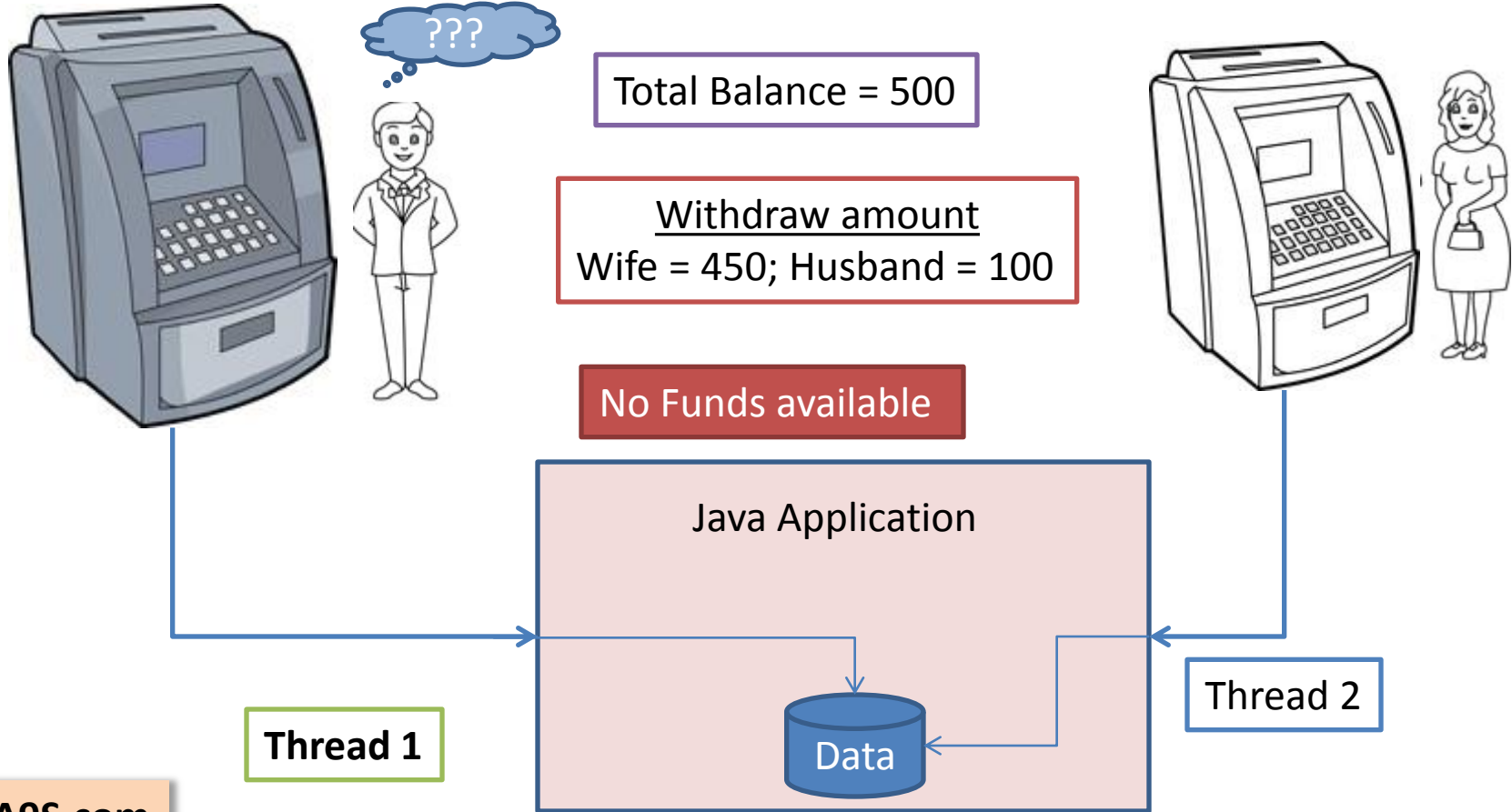
# Multithreading in Java – Part 3

## Thread Safety



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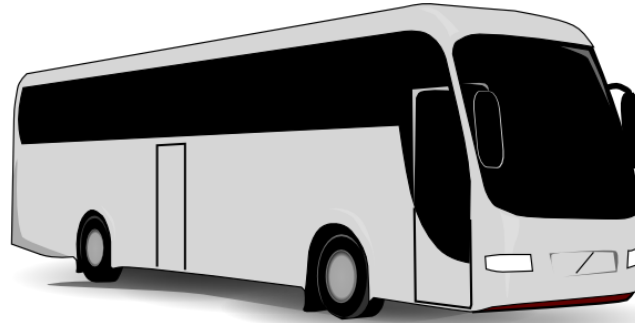
# Need for Thread Safety



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Happybus.com



Total Seats left: 3

No.of Seats wanted: 2

No.of Seats wanted: 2

When both of them get a chance to book at same time – then any one of them will get a message that there are no sufficient seats left

# Code – Without Thread Safety Demo

# Code Synchronization for thread safety

- Code Synchronization helps in preventing multiple threads executing a code simultaneously.
- Code Synchronization is implemented with the help of Locks.
- A thread that is trying to access the code that is marked as Synchronized should acquire the lock from the object.
- Locks:
  - Every object has a lock. Only one lock per object.
  - Every class has a lock. Only one lock per loaded class file. (For static methods)

# Synchronize - Few points

- Synchronize can only be applied for methods and block of code.
- Synchronize cannot be applied for classes and instance fields.

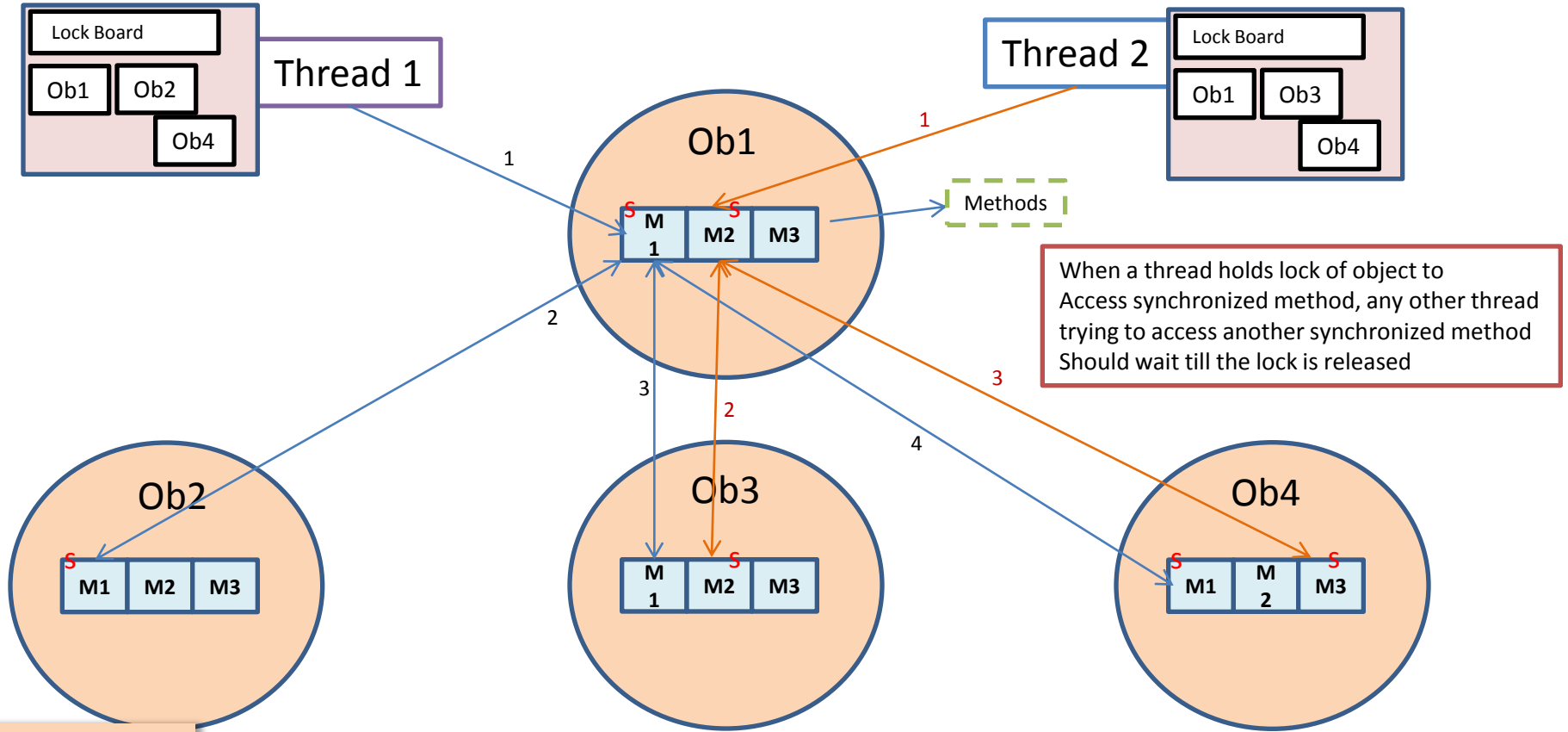
## Syntax:

```
public synchronize void method(){ }
```

```
public static synchronize void method{...}
```

```
synchronize(this){...}
```

# Locks for Thread Safety



# Locks - An example

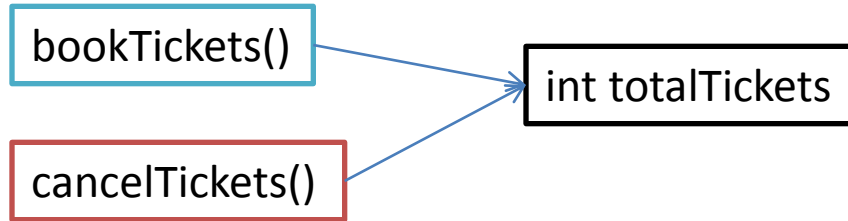


Locks for Objects and class files work as hotel rooms.

A person entering the room should have a lock and any other person who needs to occupy that room should wait till the lock is released.



# Why only Single lock?



Both methods can impact the value of TotalTickets variable. To avoid conflict and confusion, One lock per object helps to Keep threads away from manipulating instance variables through methods.

Remember to keep the instance variables marked as private in multithread environment to avoid manipulating them by threads

Unnecessary code synchronization will effect the applications performance.

# Code Synchronization - DEMO

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