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## Programming Language Concepts

### Quiz 1, II Semester, 2023–2024

*30 January, 2024*

1. Consider the following Java code skeleton.

```
public abstract class Animal{
    public boolean equals(Animal a){ ...}
}

public class Bird extends Animal{
    public boolean equals(Bird b) {...}
}

public class Mammal extends Animal{
    public boolean equals(Mammal m) {...}
}

public class TestAnimals{
    public static void main(String[] args){
        Bird ostrich = new Bird(...);
        Mammal dolphin = new Mammal(...);
        Object od = dolphin;
        Animal ao = ostrich;
    }
}
```

Against each of the following, tick the `equals()` method that is invoked, among `Object.equals()`, `Animal.equals()`, `Bird.equals()` and `Mammal.equals()`.

(a) <code>od.equals(ostrich);</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) <code>od.equals(dolphin);</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) <code>ao.equals(ostrich);</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) <code>ao.equals(dolphin);</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) <code>ostrich.equals(od);</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) <code>dolphin.equals(ao);</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Consider the following Java code fragment.

```
public class Ticket {...}
public class ETicket extends Ticket{...
    // Adds a new instance variable QRcode
    // and defines a new method getQRcode();
}
```

```
ETicket[] etktarr = new ETicket[10];
Ticket[] ticketarr = etktarr;
```

For each of the following statements, select whether the statement is legal, generates a compile-time error, or generates a run-time error.

(a) <code>ticketarr[4] = new Ticket();</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) <code>ticketarr[7] = new ETicket();</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) <code>QRcode q = etktarr[3].getQRcode();</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) <code>QRcode q = ticketarr[8].getQRcode();</code>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>