

Set

This program is modeled after the game *Set*.

The following directions are from the game Set made by Set Enterprises, Inc.

The object of the game is to identify a set of three cards from 12 cards. Each card has four features, which can vary as follows:

- a) SYMBOLS (or shapes): Each card contains shapes that are only *circles*, or only *triangles*, or only *squares* on it.
- b) COLORS: The symbols are *red*, *blue* or *green*.
- c) NUMBER: Each card has 1, 2 or 3 symbols on it.
- d) SHADING: The symbols are shaded either *clear*, *dashed* or *solid*.

A “**set**” consists of 3 cards in which each of the four features is the *same* or is *different* on all cards. In other words,

- (a) the symbols (or shapes) must be the same on all three cards or different on all three cards;
- (b) the color must be the same on all three cards or different on all three cards;
- (c) the number must be the same on all three cards or different on all three cards;
- (d) the shading must be the same on all three cards or different on all three cards;

If only 2 of the 3 cards have the same feature, then it is not a ”**set**”.

You have been given the completed `Card` class which models a card from the game Set, with the following accessor methods:

`getShape()` returns the shape of the object (circle, triangle or square)

`getColor()` returns the color of the object (red, blue or green)

`getNumber()` returns the number (1, 2 or 3)

`getShading()` returns the shading of the object (clear, dashed or solid)

You have also been given the incomplete class `GameSet`. You will complete the following methods in this class:

```
public static boolean isSet(Card c1, Card c2, Card c3)
```

This method returns true if the three Cards `c1`, `c2` and `c3` form a “**set**”. Otherwise the method returns false.

```
public static Card makeSet(Card c1, Card c2)
```

This method return the `Card`, which, when combined with `Card c1` and `Card c2`, forms a “**set**”.

```
public static boolean containsSet(Card[] cards)
```

This method returns true if the array `cards` contains one or more sets. Special note: You may not make any assumption about the length of the array `cards`.

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A sample run of this program is as follows:

```
Card c1 = new Card (1, "square" , "red", "clear");
Card c2 = new Card (2, "square" , "red", "clear");
Card c3 = new Card (3, "square" , "red", "clear");
Card c4 = new Card (1, "square" , "blue", "clear");

GameSet.isSet(c1, c2, c3) returns true
GameSet.isSet(c1, c2, c4) returns false

GameSet.makeSet(c1, c2) returns a card that is equal to c3

Card[] temp = { new Card(2, "square", "red", "dashed"),
                new Card(2, "circle", "green", "dashed"),
                new Card(3, "square", "red", "dashed"),
                new Card(2, "triangle", "blue", "solid"),
                new Card(2, "triangle", "green", "clear"),
                new Card(3, "square", "blue", "dashed"),
                new Card(1, "square", "blue", "dashed"),
                new Card(3, "circle", "red", "clear"),
                new Card(1, "triangle", "blue", "solid"),
                new Card(1, "square", "green", "clear"),
                new Card(3, "triangle", "green", "clear"),
                new Card(3, "circle", "blue", "dashed"),
                new Card(3, "circle", "blue", "dashed"),
                new Card(3, "square", "green", "clear"),
                new Card(1, "square", "green", "clear") };

GameSet.containsSet(temp) returns false
Card[] temp1 = { new Card(2, "square", "red", "dashed"),
                 new Card(2, "circle", "green", "dashed"),
                 new Card(3, "square", "red", "dashed"),
                 new Card(2, "triangle", "blue", "solid"),
                 new Card(2, "triangle", "green", "clear"),
                 new Card(3, "square", "blue", "dashed"),
                 new Card(1, "square", "blue", "dashed"),
                 new Card(3, "square", "red", "clear"),
                 new Card(1, "triangle", "blue", "solid"),
                 new Card(1, "square", "green", "clear"),
                 new Card(3, "triangle", "green", "clear"),
                 new Card(3, "circle", "blue", "dashed"),
                 new Card(3, "circle", "blue", "dashed"),
                 new Card(3, "square", "green", "clear"),
                 new Card(1, "square", "green", "clear") };

GameSet.containsSet(temp1) returns false.
```