

# OM2108: Functional Programming

## Assignment 2

### Test Results

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#### Functions

**Variable Names:**

- pip** : The value of the card
- suit** : The suit of the card
- seed** : An integer to initialise the random number generator

#### 1. pCard

- **Test Case**

1. A **card** that has **no predecessor**
2. A **card** that **has a predecessor**

Test Case	Card	pip	suit	Expected Result	Status
1	Ace	Ace	Diamonds		Pass
2	Two	Two	Spades	(Ace,Spades)	Pass
	Three	Three	Clubs	(Two,Clubs)	Pass
	Four	Four	Hearts	(Three,Hearts)	Pass
	Five	Five	Diamonds	(Four,Diamonds)	Pass
	Six	Six	Spades	(Five,Spades)	Pass
	Seven	Seven	Clubs	(Six,Clubs)	Pass
	Eight	Eight	Hearts	(Seven,Hearts)	Pass
	Nine	Nine	Diamonds	(Eight,Diamonds)	Pass
	Ten	Ten	Spades	(Nine,Spades)	Pass
	Jack	Jack	Clubs	(Ten,Clubs)	Pass
	Queen	Queen	Hearts	(Jack,Hearts)	Pass
	King	King	Diamonds	(Queen,Diamonds)	Pass

*Table 1: Test Results of pCard*

## 2. sCard

- **Test Case**

1. A **card** that **has a successor**
2. A **card** that has **no successor**

Test Case	Card	pip	suit	Expected Result	Status
1	Ace	Ace	Diamonds	(Two,Diamonds)	Pass
	Two	Two	Hearts	(Three,Hearts)	Pass
	Three	Three	Clubs	(Four,Clubs)	Pass
	Four	Four	Spades	(Five,Spades)	Pass
	Five	Five	Diamonds	(Six,Diamonds)	Pass
	Six	Six	Hearts	(Seven,Hearts)	Pass
	Seven	Seven	Clubs	(Eight,Clubs)	Pass
	Eight	Eight	Spades	(Nine,Spades)	Pass
	Nine	Nine	Diamonds	(Ten,Diamonds)	Pass
	Ten	Ten	Hearts	(Jack,Hearts)	Pass
	Jack	Jack	Clubs	(Queen,Clubs)	Pass
	Queen	Queen	Spades	(King,Spades)	Pass
2	King	King	Diamonds		Pass

*Table 2: Test Results of sCard*

### 3. isAce

- **Test Case**

1. **Ace** Cards
2. **Non-Ace** Cards

Test Case	Card	pip	suit	Expected Result	Actual Result	Status
1	Ace	Ace	Diamonds	True	True	Pass
		Ace	Clubs	True	True	Pass
		Ace	Hearts	True	True	Pass
		Ace	Spades	True	True	Pass
2	Two	Two	Clubs	False	False	Pass
	Five	Five	Hearts	False	False	Pass
	Seven	Seven	Diamonds	False	False	Pass
	King	King	Spades	False	False	Pass

*Table 3: Test Results of isAce*

### 4. isKing

- **Test Case**

1. **King** Cards
2. **Non-King** Cards

Test Case	Card	pip	suit	Expected Result	Actual Result	Status
1	King	King	Diamonds	True	True	Pass
		King	Clubs	True	True	Pass
		King	Hearts	True	True	Pass
		King	Spades	True	True	Pass
2	Three	Three	Diamonds	False	False	Pass
	Four	Four	Clubs	False	False	Pass
	Nine	Nine	Hearts	False	False	Pass
	Queen	Jack	Spades	False	False	Pass

*Table 4: Test Results of isKing*

## 5. pack

- **Test Case:** Tests if it returns the entire pack of 52 cards

Actual Result	Status
[(Ace,Diamonds),(Two,Diamonds),(Three,Diamonds),(Four,Diamonds),(Five,Diamonds),(Six,Diamonds),(Seven,Diamonds),(Eight,Diamonds),(Nine,Diamonds),(Ten,Diamonds),(Jack,Diamonds),(Queen,Diamonds),(King,Diamonds),(Ace,Clubs),(Two,Clubs),(Three,Clubs),(Four,Clubs),(Five,Clubs),(Six,Clubs),(Seven,Clubs),(Eight,Clubs),(Nine,Clubs),(Ten,Clubs),(Jack,Clubs),(Queen,Clubs),(King,Clubs),(Ace,Hearts),(Two,Hearts),(Three,Hearts),(Four,Hearts),(Five,Hearts),(Six,Hearts),(Seven,Hearts),(Eight,Hearts),(Nine,Hearts),(Ten,Hearts),(Jack,Hearts),(Queen,Hearts),(King,Hearts),(Ace,Spades),(Two,Spades),(Three,Spades),(Four,Spades),(Five,Spades),(Six,Spades),(Seven,Spades),(Eight,Spades),(Nine,Spades),(Ten,Spades),(Jack,Spades),(Queen,Spades),(King,Spades)]	Pass

**Table 5: Test Results of pack**

## 6. shuffle

- **Test Case:** Tests whether **different numbers/seeds** returns **different orders of packs of cards**

Seed	Actual Result	Status
22	[(Three,Hearts),(Eight,Hearts),...,(Ace,Hearts),(Three,Clubs),(Nine,Clubs)]	Pass
123	[(Jack,Hearts),(Eight,Diamonds),(Six,Hearts),...,(King,Spades),(Six,Clubs)]	Pass
69	[(Ten,Clubs),(Queen,Spades),...,(Six,Hearts),(Three,Diamond),(Six,Spades)]	Pass
29	[(Queen,Diamonds),(Three,Spades),...,(Nine,Diamonds),(Four,Spades)]	Pass

**Table 6: Test Results of shuffle**

## 7. eODeal

- **Test Case:** Tests whether **different numbers/seeds** returns **different orders of boards (0 card in foundation, 4 cells, 8 stacks of 6 cards in tableau)**

Seed	Actual Result	Status
3	[[[(Four,Diamonds),(Queen,Clubs),(Nine,Diamonds),(Six,Clubs)],[(Four,Diamonds),(Queen,Clubs),(Nine,Diamonds),(Six,Clubs),(Ten,Spades),(Four,Hearts)],[(Five,Hearts),(Three,Clubs),(King,Diamonds),(Eight,Clubs),(Seven,Hearts),(Jack,Diamonds)],[(Two,Spades),(Jack,Hearts),(Six,Diamonds),(Queen,Hearts),(Five,Spades),(Four,Clubs)],[(Five,Diamonds),(Seven,Spades),(Two,Hearts),(Ten,Hearts),(Three,Hearts),(Seven,Clubs)],[(Nine,Hearts),(Two,Diamonds),(Three,Diamonds),(Queen,Diamonds),(Eight,Hearts),(Nine,Spades)],[(King,Hearts),(Jack,Spades),(Eight,Diamonds),(Six,Spades),(Six,Hearts),(Three,Spades)],[(Eight,Spades),(King,Clubs),(Five,Clubs),(Ace,Diamonds),(Queen,Spades),(Ace,Clubs)],[(Ace,Hearts),(Ten,Clubs),(Seven,Diamonds),(Two,Clubs),(Ten,Diamonds),(Ace,Spades)]]]	Pass

21	([],[(Queen,Hearts),(King,Clubs),(Nine,Diamonds),(Queen,Clubs)],[(Queen,Hearts),(King,Clubs),(Nine,Diamonds),(Queen,Clubs),(Eight,Clubs),(Nine,Hearts)],[(Three,Clubs),(Five,Clubs),(Five,Spades),(Eight,Hearts),(Seven,Diamonds),(Jack,Clubs)],[(Four,Clubs),(Six,Hearts),(Nine,Clubs),(Four,Hearts),(Three,Hearts),(Seven,Clubs)],[(Ten,Clubs),(Queen,Spades),(Jack,Hearts),(Six,Diamonds),(Ace,Spades),(Two,Clubs)],[(Two,Diamonds),(Seven,Hearts),(Ten,Hearts),(King,Diamonds),(Queen,Diamonds),(Five,Diamonds)],[(Two,Hearts),(Three,Spades),(King,Spades),(Ten,Diamonds),(Four,Spades),(Nine,Spades)],[(Two,Spades),(Eight,Spades),(Ten,Spades),(Ace,Hearts),(Eight,Diamonds),(King,Hearts)],[(Jack,Spades),(Four,Diamonds),(Six,Clubs),(Five,Hearts),(Three,Diamonds),(Ace,Diamonds)])	Pass
64	([],[(Seven,Diamonds),(Two,Spades),(Nine,Clubs),(Ace,Clubs)],[(Seven,Diamonds),(Two,Spades),(Nine,Clubs),(Ace,Clubs),(Ten,Hearts),(Eight,Clubs)],[(King,Spades),(Five,Spades),(Queen,Spades),(Two,Clubs),(Jack,Spades),(Nine,Diamonds)],[(Ace,Hearts),(Ten,Clubs),(Seven,Hearts),(Ten,Spades),(Three,Diamonds),(Four,Spades)],[(Three,Spades),(Jack,Hearts),(Ace,Diamonds),(Eight,Spades),(Seven,Spades),(Six,Clubs)],[(Eight,Hearts),(Six,Spades),(Six,Diamonds),(Four,Diamonds),(Queen,Hearts),(Nine,Hearts)],[(Three,Clubs),(King,Clubs),(King,Hearts),(Ace,Spades),(Ten,Diamonds),(Eight,Diamonds)],[(Seven,Clubs),(Six,Hearts),(Five,Clubs),(Four,Hearts),(Four,Clubs),(Queen,Diamonds)],[(Jack,Clubs),(King,Diamonds),(Jack,Diamonds),(Five,Hearts),(Three,Hearts),(Two,Hearts)])	Pass

**Table 7: Test Results of shuffle**

## 8. toFoundations

### • Test Case

1. **No aces** as first card of tableau/cell
2. At least **one ace** as first card of tableau/cell
3. At least **once ace and successor** in tableau/cell
- 4.

Test Case	eOBoard	Result	Status
1	([],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts)],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts),(Five,Diamonds),(Six,Hearts)],[(Seven,Hearts),(Queen,Hearts),(Jack,Clubs),(Five,Spades),(King,Diamonds),(Three,Hearts)],[(Four,Spades),(Two,Hearts),(King,Clubs),(Three,Spades),(Seven,Spades),(Five,Hearts)],[(Seven,Diamonds),(Ace,Spades),(Queen,Clubs),(Six,Diamonds),(Jack,Spades),(Seven,Clubs)],[(Eight,Hearts),(Ten,Clubs),(Two,Spades),(Queen,Diamonds),(King,Spades),(Eight,Spades)],[(Two,Diamonds),(Six,Clubs),(Ten,Spades),(Three,Diamonds),(Two,Clubs),(Jack,Diamonds)],[(Nine,Hearts),(Eight,Clubs),(Three,Clubs),(Four,Clubs),(Nine,Diamonds),(Ace,Clubs)],[(Queen,Spades),(Ace,Diamonds),(Four,Hearts),(Ten,Hearts),(Nine,Clubs),(Six,Spades)])	([],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts)],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts),(Five,Diamonds),(Six,Hearts)],[(Seven,Hearts),(Queen,Hearts),(Jack,Clubs),(Five,Spades),(King,Diamonds),(Three,Hearts)],[(Four,Spades),(Two,Hearts),(King,Clubs),(Three,Spades),(Seven,Spades),(Five,Hearts)],[(Seven,Diamonds),(Ace,Spades),(Queen,Clubs),(Six,Diamonds),(Jack,Spades),(Seven,Clubs)],[(Eight,Hearts),(Ten,Clubs),(Two,Spades),(Queen,Diamonds),(King,Spades),(Eight,Spades)],[(Two,Diamonds),(Six,Clubs),(Ten,Spades),(Three,Diamonds),(Two,Clubs),(Jack,Diamonds)],[(Nine,Hearts),(Eight,Clubs),(Three,Clubs),(Four,Clubs),(Nine,Diamonds),(Ace,Clubs)],[(Queen,Spades),(Ace,Diamonds),(Four,Hearts),(Ten,Hearts),(Nine,Clubs),(Six,Spades)])	Pass
2	([],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades)],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades),(Nine,Hearts),(Seven,Clubs)],[(Five,Hearts),(Queen,Spades),(Seven,Hearts),(Jack,Clubs),(Four,Diamonds),(King,Hearts)],[(Ace,Hearts),(Queen,Hearts),(Three,Diamonds),(Two,Diamonds),(Eight,Hearts),(Ace,Clubs)],[(Jack,Diamonds),(King,Diamonds),(King,Clubs),(Two,Hearts),(Three,Spades),(Three,Clubs)],[(Four,Spades),(Jack,Hearts),(Ten,Clubs),(Jack,Spades),(Four,Hearts),(Two,Spades)],[(Nine,Clubs),(Ten,Diamonds),(Six,Clubs),(Seven,Spades),(Nine,Spades),(Five,Spades)],[(Ten,Spades),(Nine,Diamonds),(Three,Hearts),(Five,Diamonds),(Four,Clubs),(Seven,Diamonds)],[(Queen,Clubs),(Eight,Diamonds),(Ace,Diamonds),(Six,Diamonds),(Six,Spades),(Six,Hearts)])	([],[(Ace,Hearts)],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades)],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades),(Nine,Hearts),(Seven,Clubs)],[(Five,Hearts),(Queen,Spades),(Seven,Hearts),(Jack,Clubs),(Four,Diamonds),(King,Hearts)],[(Queen,Hearts),(Three,Diamonds),(Two,Diamonds),(Eight,Hearts),(Ace,Clubs)],[(Jack,Diamonds),(King,Diamonds),(King,Clubs),(Two,Hearts),(Three,Spades),(Three,Clubs)],[(Four,Spades),(Jack,Hearts),(Ten,Clubs),(Jack,Spades),(Four,Hearts),(Two,Spades)],[(Nine,Clubs),(Ten,Diamonds),(Six,Clubs),(Seven,Spades),(Nine,Spades),(Five,Spades)],[(Ten,Spades),(Nine,Diamonds),(Three,Hearts),(Five,Diamonds),(Four,Clubs),(Seven,Diamonds)],[(Queen,Clubs),(Eight,Diamonds),(Ace,Diamonds),(Six,Diamonds),(Six,Spades),(Six,Hearts)],[(Ace,Hearts)])	Pass

		arts]]))	
	([],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs),(Ace,Hearts)],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs),(Ace,Hearts),(Eight,Spades),(Six,Diamonds)],[(Ten,Spades),(Three,Diamonds),(Jack,Spades),(King,Clubs),(Queen,Spades),(Four,Spades)],[(Four,Diamonds),(King,Diamonds),(Four,Hearts),(King,Hearts),(Eight,Diamonds),(Five,Spades)],[(Three,Spades),(Seven,Hearts),(Nine,Hearts),(Five,Diamonds),(Queen,Hearts),(Six,Hearts)],[(King,Spades),(Jack,Clubs),(Eight,Hearts),(Two,Diamonds),(Ace,Spades),(Nine,Diamonds)],[(Ace,Diamonds),(Jack,Hearts),(Seven,Clubs),(Four,Clubs),(Five,Hearts),(Two,Hearts)],[(Seven,Spades),(Ten,Hearts),(Five,Clubs),(Two,Clubs),(Three,Clubs),(Three,Hearts)],[(Nine,Spades),(Six,Clubs),(Ten,Diamonds),(Ace,Clubs),(Seven,Diamonds),(Two,Spades)])])	toFoundations (eODeal 2340) ([(Ace,Diamonds)],[(Ace,Hearts)],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs)],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs),(Eight,Spades),(Six,Diamonds)],[(Ten,Spades),(Three,Diamonds),(Jack,Spades),(King,Clubs),(Queen,Spades),(Four,Spades)],[(Four,Diamonds),(King,Diamonds),(Four,Hearts),(King,Hearts),(Eight,Diamonds),(Five,Spades)],[(Three,Spades),(Seven,Hearts),(Nine,Hearts),(Five,Diamonds),(Queen,Hearts),(Six,Hearts)],[(King,Spades),(Jack,Clubs),(Eight,Hearts),(Two,Diamonds),(Ace,Spades),(Nine,Diamonds)],[(Jack,Hearts),(Seven,Clubs),(Four,Clubs),(Five,Hearts),(Two,Hearts)],[(Seven,Spades),(Ten,Hearts),(Five,Clubs),(Two,Clubs),(Three,Clubs),(Three,Hearts)],[(Nine,Spades),(Six,Clubs),(Ten,Diamonds),(Ace,Clubs),(Seven,Diamonds),(Two,Spades)])])	Pass
3	([],[(Nine,Clubs),(King,Clubs),(Two,Diamonds),(Eight,Diamonds)],[(Nine,Clubs),(King,Clubs),(Eight,Diamonds),(Ten,Clubs),(Nine,Spades)],[(Five,Hearts),(Seven,Clubs),(Ten,Hearts),(Six,Diamonds),(Four,Clubs),(Three,Clubs)],[(Four,Spades),(Ace,Hearts),(Three,Hearts),(Ace,Clubs),(King,Diamonds),(Four,Diamonds)],[(Three,Diamonds),(Two,Hearts),(Jack,Spades),(Nine,Hearts),(Five,Clubs),(Two,Spades)],[(Six,Clubs),(Four,Hearts),(Five,Spades),(Seven,Spades),(King,Spades),(Ace,Spades)],[(Eight,Hearts),(Five,Diamonds),(Ten,Spades),(Jack,Diamonds),(Eight,Spades),(Jack,Clubs)],[(Seven,Hearts),(Three,Spades),(Ten,Diamonds),(Queen,Hearts),(Queen,Clubs),(Nine,Diamonds)],[(Ace,Diamonds),(Two,Clubs),(King,Hearts),(Six,Spades),(Queen,Diamonds),(Queen,Spades)])])	toFoundations (eODeal 9999) ([(Three,Diamonds),(Two,Diamonds),(Ace,Diamonds)],[(Nine,Clubs),(King,Clubs),(Eight,Diamonds)],[(Nine,Clubs),(King,Clubs),(Eight,Diamonds),(Ten,Clubs),(Nine,Spades)],[(Five,Hearts),(Seven,Clubs),(Ten,Hearts),(Six,Diamonds),(Four,Clubs),(Three,Clubs)],[(Four,Spades),(Ace,Hearts),(Three,Hearts),(Ace,Clubs),(King,Diamonds),(Four,Diamonds)],[(Two,Hearts),(Jack,Spades),(Nine,Hearts),(Five,Clubs),(Two,Spades)],[(Six,Clubs),(Four,Hearts),(Five,Spades),(Seven,Spades),(King,Spades),(Ace,Spades)],[(Eight,Hearts),(Five,Diamonds),(Ten,Spades),(Jack,Diamonds),(Eight,Spades),(Jack,Clubs)],[(Seven,Hearts),(Three,Spades),(Ten,Diamonds),(Queen,Hearts),(Queen,Clubs),(Nine,Diamonds)],[(Two,Clubs),(King,Hearts),(Six,Spades),(Queen,Diamonds),(Queen,Spades)])])	

**Table 8: Test Results of toFoundations**

```

*EightOff> pCard (Ace,Diamonds)
(***) Exception: pred{Pip}: tried to take `pred' of first tag in enumeration
CallStack (from HasCallStack):
  error, called at C:\Users\samuel\Documents\Assignment\year-two-assignments\Assignment 2 - Eight Off\eightoff.hs:9:123 in
  main:EightOff
*EightOff> pCard (Two,Spades)
(Ace,Spades)
*EightOff> pCard (Three,Clubs)
(Two,Clubs)
*EightOff> pCard (Four,Hearts)
(Three,Hearts)
*EightOff> pCard (Five,Diamonds)
(Four,Diamonds)
*EightOff> pCard (Six,Spades)
(Five,Spades)
*EightOff> pCard (Seven,Clubs)
(Six,Clubs)
*EightOff> pCard (Eight,Hearts)
(Seven,Hearts)
*EightOff> pCard (Nine,Diamonds)
(Eight,Diamonds)
*EightOff> pCard (Ten,Spades)

```

```

(Nine,Spades)
*EightOff> pCard (Jack,Clubs)
(Ten,Clubs)
*EightOff> pCard (Queen,Hearts)
(Jack,Hearts)
*EightOff> pCard (King,Diamonds)
(Queen,Diamonds)

*EightOff> sCard (Ace,Diamonds)
(Two,Diamonds)
*EightOff> sCard (Two,Hearts)
(Three,Hearts)
*EightOff> sCard (Three,Clubs)
(Four,Clubs)
*EightOff> sCard (Four,Spades)
(Five,Spades)
*EightOff> sCard (Five,Diamonds)
(Six,Diamonds)
*EightOff> sCard (Six,Hearts)
(Seven,Hearts)
*EightOff> sCard (Seven,Clubs)
(Eight,Clubs)
*EightOff> sCard (Eight,Spades)
(Nine,Spades)
*EightOff> sCard (Nine,Diamonds)
(Ten,Diamonds)
*EightOff> sCard (Ten,Hearts)
(Jack,Hearts)
*EightOff> sCard (Jack,Clubs)
(Queen,Clubs)
*EightOff> sCard (Queen,Spades)
(King,Spades)
*EightOff> sCard (King,Diamonds)
(** Exception: succ{Pip}: tried to take `succ' of last tag in enumeration
CallStack (from HasCallStack):
  error, called at C:\\Users\\samuel\\Documents\\Assignment\\yeartwo-assignments\\Assignment 2 - Eight Off\\eightoff.hs:9:123 in
  main:EightOff

*EightOff> isAce (Ace,Diamonds)
True
*EightOff> isAce (Ace,Clubs)
True
*EightOff> isAce (Ace,Hearts)
True
*EightOff> isAce (Ace,Spades)
True
*EightOff> isAce (Two,Clubs)
False
*EightOff> isAce (Five,Hearts)
False
*EightOff> isAce (Seven,Diamonds)
False
*EightOff> isAce (King,Spades)
False

*EightOff> isKing (King,Diamonds)
True
*EightOff> isKing (King,Clubs)
True
*EightOff> isKing (King,Hearts)

```

```

True
*EightOff> isKing (King,Spades)
True
*EightOff> isKing (Three,Diamonds)
False
*EightOff> isKing (Four, Clubs)
False
*EightOff> isKing (Nine,Hearts)
False
*EightOff> isKing (Queen,Spades)
False

*EightOff> pack
[(Ace,Diamonds),(Two,Diamonds),(Three,Diamonds),(Four,Diamonds),(Five,Diamonds),(Six,Diamonds),(Seven,Diamonds),(Eight,Diamonds),(Nine,Diamonds),(Ten,Diamonds),(Jack,Diamonds),(Queen,Diamonds),(King,Diamonds),(Ace,Clubs),(Two,Clubs),(Three,Clubs),(Four,Clubs),(Five,Clubs),(Six,Clubs),(Seven,Clubs),(Eight,Clubs),(Nine,Clubs),(Ten,Clubs),(Jack,Clubs),(Queen,Clubs),(King,Clubs),(Ace,Hearts),(Two,Hearts),(Three,Hearts),(Four,Hearts),(Five,Hearts),(Six,Hearts),(Seven,Hearts),(Eight,Hearts),(Nine,Hearts),(Ten,Hearts),(Jack,Hearts),(Queen,Hearts),(King,Hearts),(Ace,Spades),(Two,Spades),(Three,Spades),(Four,Spades),(Five,Spades),(Six,Spades),(Seven,Spades),(Eight,Spades),(Nine,Spades),(Ten,Spades),(Jack,Spades),(Queen,Spades),(King,Spades)]

*EightOff> shuffle 22
[(Three,Hearts),(Eight,Hearts),(Six,Hearts),(Seven,Diamonds),(Two,Diamonds),(Nine,Hearts),(Ten,Clubs),(Five,Hearts),(Jack,Diamonds),(Seven,Spades),(Queen,Clubs),(Four,Clubs),(Two,Hearts),(Three,Spades),(Nine,Spades),(Ten,Diamonds),(Five,Spades),(Queen,Spades),(Eight,Clubs),(Queen,Hearts),(Ace,Spades),(Ace,Diamonds),(Jack,Spades),(King,Spades),(Seven,Hearts),(Eight,Spades),(Ten,Spades),(Ten,Hearts),(Eight,Diamonds),(Seven,Clubs),(Ace,Clubs),(King,Clubs),(Queen,Diamonds),(Jack,Clubs),(Four,Hearts),(Jack,Hearts),(Two,Spades),(Six,Spades),(Five,Diamonds),(King,Diamonds),(Two,Clubs),(Four,Diamonds),(Six,Clubs),(Nine,Diamonds),(Five,Clubs),(Six,Diamonds),(Three,Diamonds),(Four,Spades),(King,Hearts),(Ace,Hearts),(Three,Clubs),(Nine,Clubs)]

*EightOff> shuffle 123
[(Jack,Hearts),(Eight,Diamonds),(Six,Hearts),(Two,Diamonds),(Ace,Clubs),(Ten,Spades),(Queen,Clubs),(Two,Hearts),(King,Clubs),(Eight,Spades),(Three,Diamonds),(Ace,Spades),(Ten,Clubs),(Jack,Spades),(Nine,Hearts),(Five,Diamonds),(Seven,Diamonds),(Queen,Hearts),(Nine,Clubs),(Three,Clubs),(King,Diamonds),(Eight,Clubs),(Four,Diamonds),(Two,Clubs),(Four,Hearts),(Three,Spades),(Two,Spades),(Seven,Spades),(Nine,Spades),(Five,Clubs),(King,Hearts),(Six,Diamonds),(Ten,Hearts),(Jack,Clubs),(Queen,Diamonds),(Four,Clubs),(Eight,Hearts),(Five,Hearts),(Ace,Diamonds),(Queen,Spades),(Four,Spades),(Ace,Hearts),(Seven,Clubs),(Ten,Diamonds),(Nine,Diamonds),(Five,Spades),(Jack,Diamonds),(Three,Hearts),(Six,Spades),(Seven,Hearts),(King,Spades),(Six,Clubs)]

*EightOff> shuffle 69
[(Ten,Clubs),(Queen,Spades),(Five,Clubs),(Two,Clubs),(Jack,Spades),(Jack,Clubs),(Three,Clubs),(Seven,Spades),(Eight,Hearts),(Two,Diamonds),(Four,Spades),(Ace,Hearts),(King,Clubs),(Ace,Spades),(King,Spades),(King,Hearts),(Eight,Clubs),(Six,Diamonds),(Four,Diamonds),(Six,Clubs),(Nine,Diamonds),(Five,Spades),(Jack,Diamonds),(Four,Clubs),(Jack,Hearts),(Seven,Diamonds),(Ten,Hearts),(Ten,Spades),(Three,Spades),(Nine,Spades),(Four,Hearts),(Five,Hearts),(Queen,Clubs),(Seven,Hearts),(Eight,Spades),(Ten,Diamonds),(Ace,Diamonds),(Seven,Clubs),(Nine,Hearts),(Nine,Clubs),(Two,Spades),(Three,Hearts),(Five,Diamonds),(Two,Hearts),(Eight,Diamonds),(Queen,Hearts),(Queen,Diamonds),(King,Diamonds),(Ace,Clubs),(Six,Hearts),(Three,Diamonds),(Six,Spades)]

*EightOff> shuffle 29
[(Queen,Diamonds),(Three,Spades),(Ace,Hearts),(Six,Spades),(Ten,Spades),(Two,Hearts),(King,Diamonds),(Four,Diamonds),(Four,Clubs),(Jack,Spades),(Ten,Hearts),(Three,Clubs),(Jack,Hearts),(Queen,Clubs),(Queen,Spades),(King,Hearts),(Ace,Spades),(Four,Hearts),(Queen,Hearts),(Two,Spades),(Jack,Diamonds),(Seven,Spades),(Eight,Diamonds),(Jack,Clubs),(Six,Diamonds),(Two,Clubs),(Three,Hearts),(Nine,Hearts),(Nine,Spades),(Six,Clubs),(Five,Clubs),(Seven,Diamonds),(Seven,Clubs),(Ace,Clubs),(Eight,Spades),(Two,Diamonds),(Eight,Clubs),(King,Spades),(Nine,Clubs),(Seven,Hearts),(Five,Diamonds),(Five,Hearts),(Ten,Diamonds),(Ace,Diamonds),(Three,Diamonds),(King,Clubs),(Eight,Hearts),(Six,Hearts),(Five,Spades),(Ten,Clubs),(Nine,Diamonds),(Four,Spades)]

*EightOff> eODeal 3
[[[(Four,Diamonds),(Queen,Clubs),(Nine,Diamonds),(Six,Clubs)],[(Four,Diamonds),(Queen,Clubs),(Nine,Diamonds),(Six,Clubs)],[(Ten,Spades),(Four,Hearts)],[(Five,Hearts),(Three,Clubs),(King,Diamonds),(Eight,Clubs),(Seven,Hearts),(Jack,Diamonds)],[(Two,Spades),(Jack,Hearts),(Six,Diamonds),(Queen,Hearts),(Five,Spades),(Four,Clubs)],[(Five,Diamonds),(Seven,Spades),(Two,Hearts),(Ten,Hearts),(Three,Hearts),(Seven,Clubs)],[(Nine,Hearts),(Two,Diamonds),(Three,Diamonds),(Queen,Diamonds),(Eight,Hearts),(Nine,Spades)],[(King,Hearts),(Jack,Spades),(Eight,Diamonds),(Six,Spades),(Six,Hearts),(Three,Spades)],[(Eight,Spades),(King,Clubs),(Five,Clubs),(Ace,Diamonds),(Queen,Spades),(Ace,Clubs)],[(Ace,Hearts),(Ten,Clubs),(Seven,Diamonds),(Two,Clubs),(Ten,Diamonds),(Ace,Spades)]]]

*EightOff> eODeal 21
[[[(Queen,Hearts),(King,Clubs),(Nine,Diamonds),(Queen,Clubs)],[(Queen,Hearts),(King,Clubs),(Nine,Diamonds),(Queen,Clubs),(Eight,Clubs),(Nine,Hearts)],[(Three,Clubs),(Five,Clubs),(Five,Spades),(Eight,Hearts),(Seven,Diamonds),(Jack,Clubs)],[(Four,Clubs),(Six,Hearts),(Nine,Clubs),(Four,Hearts),(Three,Hearts),(Seven,Clubs)],[(Ten,Clubs),(Queen,Spades),(Jack,Hearts),(Six,Diamonds),(Ace,Spades),(Two,Clubs)],[(Two,Diamonds),(Seven,Hearts),(Ten,Hearts),(King,Diamonds),(Queen,Diamonds),(Five,Diamonds)],[(Two,Hearts),(Three,Spades),(King,Spades),(Ten,Diamonds),(Four,Spades),(Nine,Spades)],[(Two,Spades),(Eight,Spades),(Ten,Spades),(Ace,Hearts),(Eight,Diamonds),(King,Hearts)],[(Jack,Spades),(Four,Diamonds),(Six,

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,Clubs),(Five,Hearts),(Three,Diamonds),(Ace,Diamonds]]])

\*EightOff> eODeal 64

([],[(Seven,Diamonds),(Two,Spades),(Nine,Clubs),(Ace,Clubs)],[(Seven,Diamonds),(Two,Spades),(Nine,Clubs),(Ace,Clubs),(Ten,Hearts),(Eight,Clubs)],[(King,Spades),(Five,Spades),(Queen,Spades),(Two,Clubs),(Jack,Spades),(Nine,Diamonds)],[(Ace,Hearts),(Ten,Clubs),(Seven,Hearts),(Ten,Spades),(Three,Diamonds),(Four,Spades)],[(Three,Spades),(Jack,Hearts),(Ace,Diamonds),(Eight,Spades),(Seven,Spades),(Six,Clubs)],[(Eight,Hearts),(Six,Spades),(Six,Diamonds),(Four,Diamonds),(Queen,Hearts),(Nine,Hearts)],[(Three,Clubs),(King,Clubs),(King,Hearts),(Ace,Spades),(Ten,Diamonds),(Eight,Diamonds)],[(Seven,Clubs),(Six,Hearts),(Five,Clubs),(Four,Hearts),(Four,Clubs),(Queen,Diamonds)],[(Jack,Clubs),(King,Diamonds),(Jack,Diamonds),(Five,Hearts),(Three,Hearts),(Two,Hearts)]])

\*EightOff> boardTest1 = eODeal 1

\*EightOff> boardTest1

([],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts)],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts),(Five,Diamonds),(Six,Hearts)],[(Seven,Hearts),(Queen,Hearts),(Jack,Clubs),(Five,Spades),(King,Diamonds),(Three,Hearts)],[(Four,Spades),(Two,Hearts),(King,Clubs),(Three,Spades),(Seven,Spades),(Five,Hearts)],[(Seven,Diamonds),(Ace,Spades),(Queen,Clubs),(Six,Diamonds),(Jack,Spades),(Seven,Clubs)],[(Eight,Hearts),(Ten,Clubs),(Two,Spades),(Queen,Diamonds),(King,Spades),(Eight,Spades)],[(Two,Diamonds),(Six,Clubs),(Ten,Spades),(Three,Diamonds),(Two,Clubs),(Jack,Diamonds)],[(Nine,Hearts),(Eight,Clubs),(Three,Clubs),(Four,Clubs),(Nine,Diamonds),(Ace,Clubs)],[(Queen,Spades),(Ace,Diamonds),(Four,Hearts),(Ten,Hearts),(Nine,Clubs),(Six,Spades)]])

\*EightOff> toFoundations boardTest1

([],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts)],[(King,Hearts),(Ten,Diamonds),(Eight,Diamonds),(Jack,Hearts),(Five,Diamonds),(Six,Hearts)],[(Seven,Hearts),(Queen,Hearts),(Jack,Clubs),(Five,Spades),(King,Diamonds),(Three,Hearts)],[(Four,Spades),(Two,Hearts),(King,Clubs),(Three,Spades),(Seven,Spades),(Five,Hearts)],[(Seven,Diamonds),(Ace,Spades),(Queen,Clubs),(Six,Diamonds),(Jack,Spades),(Seven,Clubs)],[(Eight,Hearts),(Ten,Clubs),(Two,Spades),(Queen,Diamonds),(King,Spades),(Eight,Spades)],[(Two,Diamonds),(Six,Clubs),(Ten,Spades),(Three,Diamonds),(Two,Clubs),(Jack,Diamonds)],[(Nine,Hearts),(Eight,Clubs),(Three,Clubs),(Four,Clubs),(Nine,Diamonds),(Ace,Clubs)],[(Queen,Spades),(Ace,Diamonds),(Four,Hearts),(Ten,Hearts),(Nine,Clubs),(Six,Spades)]])

\*EightOff> boardTest2 = eODeal 69

\*EightOff> boardTest2

([],[(Ten,Clubs),(Queen,Spades),(Five,Clubs),(Two,Clubs)],[(Ten,Clubs),(Queen,Spades),(Five,Clubs),(Two,Clubs),(Jack,Spades),(Jack,Clubs)],[(Three,Clubs),(Seven,Spades),(Eight,Hearts),(Two,Diamonds),(Four,Spades),(Ace,Hearts)],[(King,Clubs),(Ace,Spades),(King,Spades),(King,Hearts),(Eight,Clubs),(Six,Diamonds)],[(Four,Diamonds),(Six,Clubs),(Nine,Diamonds),(Five,Spades),(Jack,Diamonds),(Four,Clubs)],[(Jack,Hearts),(Seven,Diamonds),(Ten,Hearts),(Ten,Spades),(Three,Spades),(Nine,Spades)],[(Four,Hearts),(Five,Hearts),(Queen,Clubs),(Seven,Hearts),(Eight,Spades),(Ten,Diamonds)],[(Ace,Diamonds),(Seven,Clubs),(Nine,Hearts),(Nine,Clubs),(Two,Spades),(Three,Hearts)],[(Five,Diamonds),(Two,Hearts),(Eight,Diamonds),(Queen,Hearts),(Queen,Diamonds),(King,Diamonds)]])

\*EightOff> toFoundations boardTest2

([[[Ace,Diamonds]]],[(Ten,Clubs),(Queen,Spades),(Five,Clubs),(Two,Clubs)],[(Ten,Clubs),(Queen,Spades),(Five,Clubs),(Two,Clubs),(Jack,Spades),(Jack,Clubs)],[(Three,Clubs),(Seven,Spades),(Eight,Hearts),(Two,Diamonds),(Four,Spades),(Ace,Hearts)],[(King,Clubs),(Ace,Spades),(King,Spades),(King,Hearts),(Eight,Clubs),(Six,Diamonds)],[(Four,Diamonds),(Six,Clubs),(Nine,Diamonds),(Five,Spades),(Jack,Diamonds),(Four,Clubs)],[(Jack,Hearts),(Seven,Diamonds),(Ten,Hearts),(Ten,Spades),(Three,Spades),(Nine,Spades)],[(Four,Hearts),(Five,Hearts),(Queen,Clubs),(Seven,Hearts),(Eight,Spades),(Ten,Diamonds)],[(Ace,Diamonds),(Seven,Clubs),(Nine,Hearts),(Nine,Clubs),(Two,Spades),(Three,Hearts)],[(Five,Diamonds),(Two,Hearts),(Eight,Diamonds),(Queen,Hearts),(Queen,Diamonds),(King,Diamonds)]])

\*EightOff> eODeal 2479

([],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades)],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades),(Nine,Hearts),(Seven,Clubs)],[(Five,Hearts),(Queen,Spades),(Seven,Hearts),(Jack,Clubs),(Four,Diamonds),(King,Hearts)],[(Ace,Hearts),(Queen,Hearts),(Three,Diamonds),(Two,Diamonds),(Eight,Hearts),(Ace,Clubs)],[(Jack,Diamonds),(King,Diamonds),(King,Clubs),(Two,Hearts),(Three,Spades),(Three,Clubs)],[(Four,Spades),(Jack,Hearts),(Ten,Clubs),(Jack,Spades),(Four,Hearts),(Two,Spades)],[(Nine,Clubs),(Ten,Diamonds),(Six,Clubs),(Seven,Spades),(Nine,Spades),(Five,Spades)],[(Ten,Spades),(Nine,Diamonds),(Three,Hearts),(Five,Diamonds),(Four,Clubs),(Seven,Diamonds)],[(Queen,Clubs),(Eight,Diamonds),(Ace,Diamonds),(Six,Diamonds),(Six,Spades),(Six,Hearts)]])

\*EightOff> toFoundations (eODeal 2479)

([[[Ace,Hearts]]],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades)],[(Ten,Hearts),(Eight,Clubs),(Queen,Diamonds),(Eight,Spades),(Nine,Hearts),(Seven,Clubs)],[(Five,Hearts),(Queen,Spades),(Seven,Hearts),(Jack,Clubs),(Four,Diamonds),(King,Hearts)],[(Queen,Hearts),(Three,Diamonds),(Two,Diamonds),(Eight,Hearts),(Ace,Clubs)],[(Jack,Diamonds),(King,Diamonds),(King,Clubs),(Two,Hearts),(Three,Spades),(Three,Clubs)],[(Four,Spades),(Jack,Hearts),(Ten,Clubs),(Jack,Spades),(Four,Hearts),(Two,Spades)],[(Nine,Clubs),(Ten,Diamonds),(Six,Clubs),(Seven,Spades),(Nine,Spades),(Five,Spades)],[(Ten,Spades),(Nine,Diamonds),(Three,Hearts),(Five,Diamonds),(Four,Clubs),(Seven,Diamonds)],[(Queen,Clubs),(Eight,Diamonds),(Ace,Diamonds),(Six,Diamonds),(Six,Spades),(Six,Hearts)]])

\*EightOff> eODeal 2340

([],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs),(Ace,Hearts)],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs),(Ace,Hearts),(Eight,Spades),(Six,Diamonds)],[(Ten,Spades),(Three,Diamonds),(Jack,Spades),(King,Clubs),(Queen,Spades),(Four,Spades)],[(Four,Diamonds),(King,Diamonds),(Four,Hearts),(King,Hearts),(Eight,Diamonds),(Five,Spades)],[(Three,Spades),(Seven,Hearts),(Nine,Hearts),(Five,Diamonds),(Queen,Hearts),(Six,Hearts)],[(King,Spades),(Jack,Clubs),(Eight,Hearts),(Two,Diamonds)]])

onds),(Ace,Spades),(Nine,Diamonds)],[(Ace,Diamonds),(Jack,Hearts),(Seven,Clubs),(Four,Clubs),(Five,Hearts),(Two,Hearts)],[(Seven,Spades),(Ten,Hearts),(Five,Clubs),(Two,Clubs),(Three,Clubs),(Three,Hearts)],[(Nine,Spades),(Six,Clubs),(Ten,Diamonds),(Ace,Clubs),(Seven,Diamonds),(Two,Spades)]]

\*EightOff> toFoundations (eODeal 2340)

([(Ace,Diamonds)],[(Ace,Hearts)]),[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs)],[(Queen,Clubs),(Jack,Diamonds),(Nine,Clubs),(Eight,Spades),(Six,Diamonds)],[(Ten,Spades),(Three,Diamonds),(Jack,Spades),(King,Clubs),(Queen,Spades),(Four,Spades)],[(Four,Diamonds),(King,Diamonds),(Four,Hearts),(King,Hearts),(Eight,Diamonds),(Five,Spades)],[(Three,Spades),(Seven,Hearts),(Nine,Hearts),(Five,Diamonds),(Queen,Hearts),(Six,Hearts)],[(King,Spades),(Jack,Clubs),(Eight,Hearts),(Two,Diamonds),(Ace,Spades),(Nine,Diamonds)],[(Jack,Hearts),(Seven,Clubs),(Four,Clubs),(Five,Hearts),(Two,Hearts)],[(Seven,Spades),(Ten,Hearts),(Five,Clubs),(Two,Clubs),(Three,Clubs),(Three,Hearts)],[(Nine,Spades),(Six,Clubs),(Ten,Diamonds),(Ace,Clubs),(Seven,Diamonds),(Two,Spades)]]

\*EightOff> eODeal 9999

([],[(Nine,Clubs),(King,Clubs),(Two,Diamonds),(Eight,Diamonds)],[(Nine,Clubs),(King,Clubs),(Eight,Diamonds),(Ten,Clubs),(Nine,Spades)],[(Five,Hearts),(Seven,Clubs),(Ten,Hearts),(Six,Diamonds),(Four,Clubs),(Three,Clubs)],[(Four,Spades),(Ace,Hearts),(Three,Hearts),(Ace,Clubs),(King,Diamonds),(Four,Diamonds)],[(Three,Diamonds),(Two,Hearts),(Jack,Spades),(Nine,Hearts),(Five,Clubs),(Two,Spades)],[(Six,Clubs),(Four,Hearts),(Five,Spades),(Seven,Spades),(King,Spades),(Ace,Spades)],[(Eight,Hearts),(Five,Diamonds),(Ten,Spades),(Jack,Diamonds),(Eight,Spades),(Jack,Clubs)],[(Seven,Hearts),(Three,Spades),(Ten,Diamonds),(Queen,Hearts),(Queen,Clubs),(Nine,Diamonds)],[(Ace,Diamonds),(Two,Clubs),(King,Hearts),(Six,Spades),(Queen,Diamonds),(Queen,Spades)]]

\*EightOff> toFoundations (eODeal 9999)

([(Three,Diamonds),(Two,Diamonds),(Ace,Diamonds)],[(Nine,Clubs),(King,Clubs),(Eight,Diamonds)],[(Nine,Clubs),(King,Clubs),(Eight,Diamonds),(Ten,Clubs),(Nine,Spades)],[(Five,Hearts),(Seven,Clubs),(Ten,Hearts),(Six,Diamonds),(Four,Clubs),(Three,Clubs)],[(Four,Spades),(Ace,Hearts),(Three,Hearts),(Ace,Clubs),(King,Diamonds),(Four,Diamonds)],[(Two,Hearts),(Jack,Spades),(Nine,Hearts),(Five,Clubs),(Two,Spades)],[(Six,Clubs),(Four,Hearts),(Five,Spades),(Seven,Spades),(King,Spades),(Ace,Spades)],[(Eight,Hearts),(Five,Diamonds),(Ten,Spades),(Jack,Diamonds),(Eight,Spades),(Jack,Clubs)],[(Seven,Hearts),(Three,Spades),(Ten,Diamonds),(Queen,Hearts),(Queen,Clubs),(Nine,Diamonds)],[(Two,Clubs),(King,Hearts),(Six,Spades),(Queen,Spades)]]