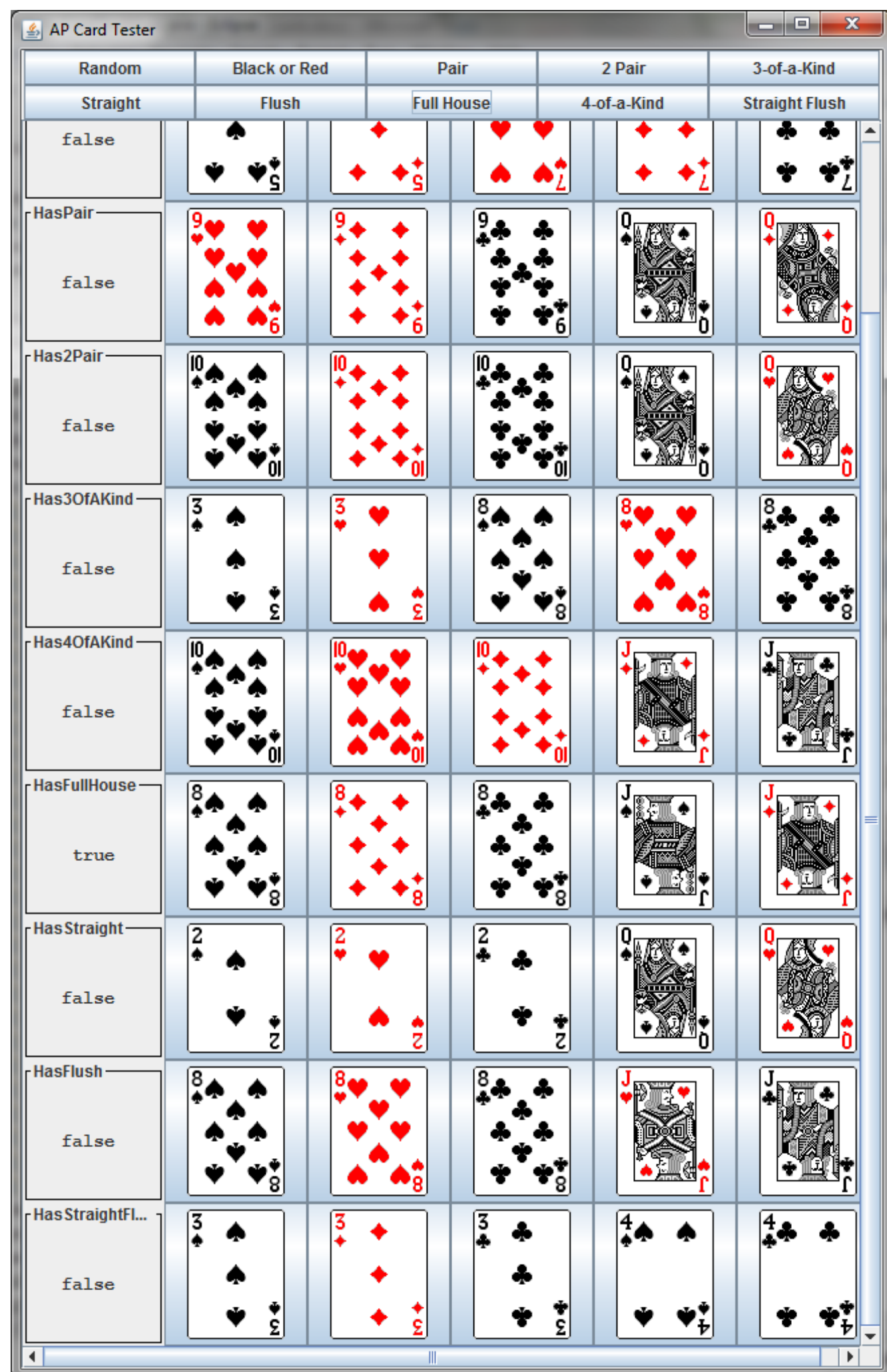


AP COMPUTER SCIENCE: PROGRAMMING YEAR 2

PLAYING CARDS: EVALUATING POKER HANDS



Given a template for a program that evaluates Poker Hands, students implement a **2-LEVEL TALLYING ALGORITHM** that **UNIQUELY** distinguishes between **1 Pair, 2 Pair, 3-of-a-Kind, Full House and 4-of-a-Kind.**

How does the Tally method work?

When you tally (count) items, the **VALUE** of the item is used as an **INDEX** into the tally list.

Card Index	Rank	Suit	Tally Idx	Tally	Multiple Idx	Multiple
0	4	♦	0	0	0	11
1	5	♦	1	0	1	2
2	8	♦	2	0	2	0
3	8	♠	3	0	3	1
4	8	♣	4	1	4	0
			5	1		
			6	0		
			7	0		
			8	3		
			9	0		
			10	0		
			11	0		
			12	0		
			13	0		

FIGURE 1

For example, when you count ballots, a candidate **ID NUMBER** is used as an **INDEX** into the Tally list, specifying the slot where the votes for that candidate get counted.

In Poker, each hand consists of 5 cards, and the **RANK** of each card is a value in the range 1 (**Ace**) to 13 (**King**). To tally a hand, you create a 14-slot list.

The **RANK** of a card is used as the **INDEX** specifying the slot in the **TALLY** list (the **green** columns in **Figure 1**). When counted, the values in the Tally list show how many times each card rank appears in the hand.

The next step is to tally the 13 slots (1-13) of the **Tally** list. We do this by creating a **2nd MULTIPLES Tally** list with 5 slots. The **VALUE** of each member of the **1st Tally** list is now used as an **INDEX** into a corresponding slot in the **MULTIPLES** list (the **pink** columns). This shows how many single cards, pairs, triplets, etc. appear in the hand.

In this way, Poker Hands can be distinguished from one another using simple one-line **BOOLEAN** expressions. For example:

1 PAIR: multiples[2] == 1 && multiples[3] == 0 or
multiples[2] == 1 && multiples[1] == 3

2 PAIR: multiples[2] == 2

3-of-a-KIND: multiples[3] == 1 && multiples[2] == 0 or
multiples[3] == 1 && multiples[1] == 2

FULL HOUSE: multiples[3] == 1 && multiples[2] == 1

4-of-a-KIND: multiples[4] == 1