Міністерство освіти, науки, молоді та спорту України
Національний університет «Львівська політехніка»

Кафедра СШІ

Лабораторна робота №3

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Завдання 1. Звязний список

Код програми:

1.1) class Node

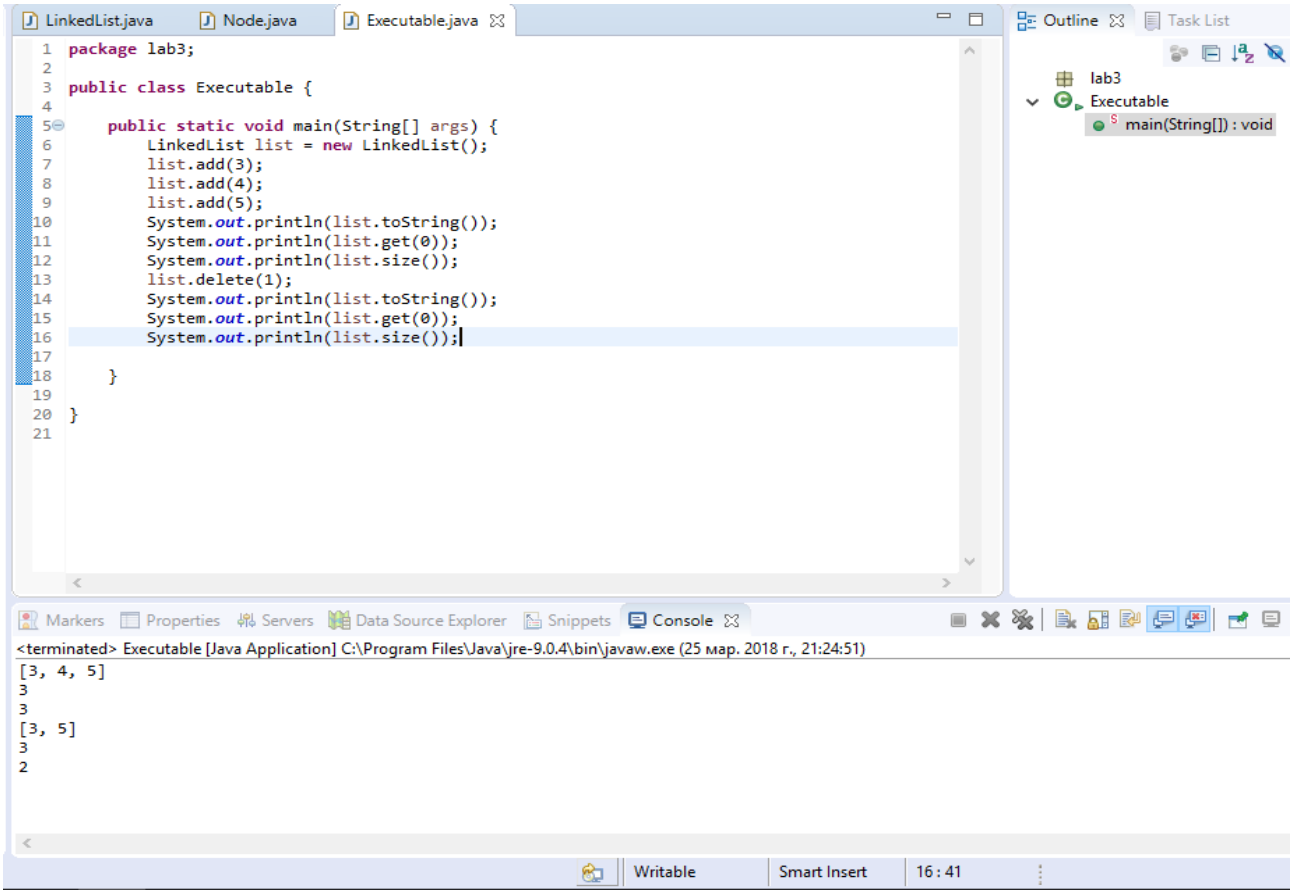
```
public class Node {
	private Node next;
	private Integer data;

	public Node() {
	}

	public Node getNext() {
		return next;
	}
	public void setNext(Node next) {
		this.next = next;
	}
	public Integer getData() {
		return data;
	}
	public void setData(Integer data) {
		this.data = data;
	}
}
```

1.2) class LinkedList

```
	public class LinkedList {
	   private Node tail;
	   private Node head;
	   private int size = 0;

	   public LinkedList() {

	   }

	   public void add(Integer data) {
	      Node newNode = new Node();
	      newNode.setData(data);

	      if (size == 0)
	         head = newNode;
	      else
	         tail.setNext(newNode);

	      tail = newNode;
	      size++;
	   }

	   public Integer get(int index) {
	      return findNodeByIndex(index).getData();
	   }

	   public boolean delete(int index) {
	      if (findNodeByIndex(index) != null ) {

	         if (index != 0)
	            findNodeByIndex(index - 1).setNext(findNodeByIndex(index+1));
	         else
	            head = head.getNext();

	         size--;
	         return true;
	      }
```

```
            return false;
        }

        public int size() {
            return size;
        }

        private Node findNodeByIndex(int index) {
            if (index < size && index >= 0) {
                Node curNode = head;
                int curIndex = 0;
                while (curIndex < index){
                    if (curNode.getNext() != null) {
                        curNode = curNode.getNext();
                        curIndex++;
                    }

                }
                return curNode;
            }
            else
                return null;
        }

        public String toString() {
            StringBuilder resultString = new StringBuilder("[");

            for (int i = 0; i < size; i++) {
                resultString.append(get(i));

                if (i < size-1) resultString.append(", ");
            }
        resultString.append("]");
        return resultString.toString();
            }
}
```

Виконання в IDE:



Завдання 2. Колода карт

Код програми:

2.1) class Card

```
public class Card {
	private Rank rank;
	private Suit suit;

	public Card(Rank rank, Suit suit) {
		this.rank = rank;
		this.suit = suit;
	}

	public Rank getRank() {
		return rank;
	}

	public void setRank(Rank rank) {
		this.rank = rank;
	}

	public Suit getSuit() {
		return suit;
	}

	public void setSuit(Suit suit) {
		this.suit = suit;
	}
}
```

2.2) class Rank

```
public class Rank {
	public static final Rank ACE = new Rank("Ace");
	public static final Rank KING = new Rank("King");
	public static final Rank QUEEN = new Rank("Queen");
	public static final Rank JACK = new Rank("Jack");
	public static final Rank TEN = new Rank("10");
	public static final Rank NINE = new Rank("9");
	public static final Rank EIGHT = new Rank("8");
	public static final Rank SEVEN = new Rank("7");
	public static final Rank SIX = new Rank("6");

	public static Rank[] values = { ACE, KING, QUEEN, JACK, TEN, NINE, EIGHT, SEVEN, SIX };

	private String name;

	Rank(String name) {
		this.name = name;
	}

	public String getName() {
		return name;
	}
}
```

2.3) class Suit

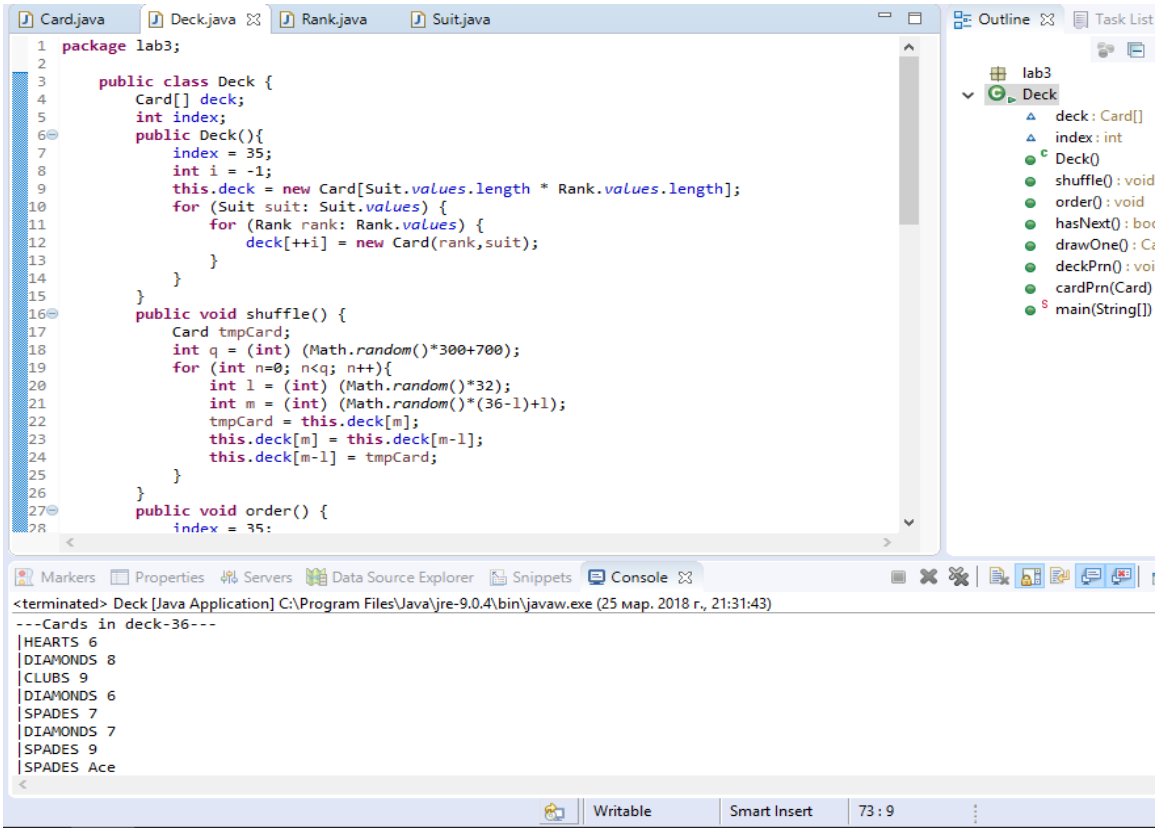
```
public class Suit {
	public static final Suit HEARTS = new Suit("HEARTS");
	public static final Suit DIAMONDS = new Suit("DIAMONDS");
	public static final Suit CLUBS = new Suit("CLUBS");
	public static final Suit SPADES = new Suit("SPADES");

	public static Suit[] values = { HEARTS, DIAMONDS, CLUBS, SPADES};

	private String name;

	Suit(String name) {
		this.name = name;
	}

	public String getName() {
		return name;
	}
}
```

2.4) class Deck

```
public class Deck {
		Card[] deck;
	int index;
		public Deck(){
		   index = 35;
			int i = -1;
			this.deck = new Card[Suit.values.length * Rank.values.length];
		   for (Suit suit: Suit.values) {
		      for (Rank rank: Rank.values) {
		         deck[++i] = new Card(rank,suit);
		      }
		   }
		}
	public void shuffle() {
		Card tmpCard;
		int q = (int) (Math.random()*300+700);
		for (int n=0; n<q; n++){
			int l = (int) (Math.random()*32);
```

```
                int m = (int) (Math.random()*(36-l)+l);
                tmpCard = this.deck[m];
                this.deck[m] = this.deck[m-l];
                this.deck[m-l] = tmpCard;
        }
    }
    public void order() {
                index = 35;
        int i = -1;
                this.deck = new Card[Suit.values.length * Rank.values.length];
          for (Suit suit: Suit.values) {
            for (Rank rank: Rank.values) {
              deck[++i] = new Card(rank,suit);
            }
          }
    }
    public boolean hasNext() {
        return index > -1;
    }
    public Card drawOne() {
        if (index >= 0)
        return this.deck[index--];
      else return null;
    }

    public void deckPrn(){
        System.out.println("---Cards in deck-"+(index+1)+"---");
          for (int j=0; j<index+1; j++){
                        System.out.print("|");
                        System.out.print(this.deck[j].getSuit().getName());
                        System.out.print(" ");
                        System.out.println(this.deck[j].getRank().getName());
          }
    }

    public void cardPrn(Card crd){
        if (crd != null){
                System.out.print(crd.getSuit().getName());
                System.out.print(" ");
                System.out.println(crd.getRank().getName());
        }
        else System.out.println("Card is NULL");
    }


        public static void main(String[] args) {

                Deck dk1 = new Deck();

                dk1.shuffle();
                dk1.deckPrn();
        }

}
```

Виконання в IDE:




```
package lab3;

    public class Deck {
        Card[] deck;
        int index;
        public Deck(){
            index = 35;
            int i = -1;
            this.deck = new Card[Suit.values.length * Rank.values.length];
            for (Suit suit: Suit.values) {
                for (Rank rank: Rank.values) {
                    deck[++i] = new Card(rank,suit);
                }
            }
        }
        public void shuffle() {
            Card tmpCard;
            int q = (int) (Math.random()*300+700);
            for (int n=0; n<q; n++){
                int l = (int) (Math.random()*32);
                int m = (int) (Math.random()*(36-1)+1);
                tmpCard = this.deck[m];
                this.deck[m] = this.deck[m-1];
                this.deck[m-1] = tmpCard;
            }
        }
        public void order() {
            index = 35;
```

Завдання 3. Числа Фібоначі

Код програми:

```
public class Fibonacci
{
 public long getNumber(int position){

        if (position == 1)
        {
           return 1;
        }
        else if (position > 0) {
           long c = 0;
           long a = 1;
           long b = 0;

           for (int i = 1; i < position; i++) {
              c = a + b;
              b = a;
              a = c;
           }

           return c;
        }
        else
        {
           return -1;
        }
 }
}
```

Виконання в IDE: