E1. Write an efficient function to find the first nonrepeated character in a string. For instance, the first nonrepeated character in "total" is 'o' and the first nonrepeated character in "teeter" is 'r'. How efficiency is your algorithms?

E2. Assume you have the class hierarchy such as:

B extends A; C extends B; D extends A

And a function:

void f(B x);

Which classes of objects can you pass to the function?

E3. Given:

```
class Top {
    public Top(String s) { System.out.print("B"); }
}

public class Bottom2 extends Top {
    public Bottom2(String s) { System.out.print("D"); }
    public static void main(String [] args) {
        new Bottom2("C");
        System.out.println(" ");
    }
}
```

What is the result?

- A. BD
- B. DB
- C. BDC
- D. DBC
- E. Compilation fails

E4. Given:

```
public class Mirror {
    int size = 7;
    public static void main(String[] args) {
        Mirror m1 = new Mirror();
        Mirror m2 = m1;
        int i1 = 10;
        int i2 = i1;
        go(m2, i2);
        System.out.println(m1.size + " " + i1);
    }
    static void go(Mirror m, int i) {
        m.size = 8;
        i = 12;
```

```
    }
}
```

What is the result?

- A. 7 10
- B. 8 10
- C. 7 12
- D. 8 12
- E. Compilation fails
- F. An exception is thrown at runtime

E5. Given

```
public class McGee {
    public static void main(String[] args) {
        Days d1 = Days.TH;
        Days d2 = Days.M;
        for(Days d: Days.values()) {
            if(d.equals(Days.F)) break;
            d2 = d;
        }
        System.out.println((d1 == d2)?"same old" : "newly new");
    }

    enum Days {M, T, W, TH, F, SA, SU};
}
```

What is the result?

- A. same old
- B. newly new
- C. Compilation fails due to multiple errors
- D. Compilation fails due only to an error on line 7
- E. Compilation fails due only to an error on line 8
- F. Compilation fails due only to an error on line 11
- G. Compilation fails due only to an error on line 13

E6. Given:

```
import java.util.*;
public class Sequence {
    public static void main(String[] args) {
        ArrayList<String> myList = new ArrayList<String>();
        myList.add("apple");
        myList.add("carrot");
        myList.add("banana");
        myList.add(1, "plum");
        System.out.print(myList);
    }
```

```
}
```

What is the result?

- A. [apple, banana, carrot, plum]
- B. [apple, plum, carrot, banana]
- C. [apple, plum, banana, carrot]
- D. [plum, banana, carrot, apple]
- E. [plum, apple, carrot, banana]
- F. [banana, plum, carrot, apple]
- G. Compilation fails

E7. Given:

```
public class OverAndOver {
    static String s = "";
    public static void main(String[] args) {
        try {
            s += "1";
            throw new Exception();
        } catch (Exception e) {
            s += "2";
        } finally {
            s += "3"; doStuff(); s += "4";
        }
        System.out.println(s);
    }
    static void doStuff() { int x = 0; int y = 7/x; }
}
```

What is the result?

- A. 12
- B. 13
- C. 123
- D. 1234
- E. Compilation fails
- F. 123 followed by an exception
- G. 1234 followed by an exception
- H. An exception is thrown with no other output

E8. Write an efficient algorithm to reverse all words in a string. Assume that words in the string are space delimiter-seperated. For example if input is "Today is the great day" then output should be "day great the is Today".

E9. Given a database as below:

- Supplier(name, address) // name is the primary key
- Product(title, price, year, sname) // tile is the primary key and sname is a foreign key references to Supplier's name

- Order(product, quantity, delivered) //product is a foreign key references to Product.title

a. Write a SQL query to select all Product with price > 1000 and show they Supplier's name.

b. Write a SQL script to update delivered = true for all Order with product = "Iphone XS Max"

c. Write a SQL query to show total number of products has ordered for each Supplier.

E10. There is a group of students: three males and four females. The students go to visit the Ho Chi Minh temple and they have to stand in a line. How many ways do they stand such as no male standing next to other male?