Question 1 (5 marks)

Rewrite the following code without redundancy

```
        if(flag==true && stop==false){
             i=0;
             while(stop==false && i<10){
                 for(int j=0;j<i && isLineEmpty==false;j++){
                     line=readSingleLine();
                     isLineEmpty=checkLine(line);
                 }
             }
         }
```

```
if (flag && !stop){
    i=0;
    while (!stop && i<10){
        for (int j=0; j<i && !isLineEmpty;j++){
            line=readSingleLine();
            isLineEmpty=checkLine(line);
        }
    }
}
```

Question 2 (2+8=10 marks)

a) What is the output of this piece of code?

b) If you think the code has syntax errors, then briefly locate and describe each error.

```
1       {
2           //block a
3           int a=10;
4           {
5               //block b
6               int b=20;
7               {
8                   //block c
9                   int c=30;
10                  System.out.println(a+","+b+","+c);
11              }
12              System.out.println(a+","+b+","+c);
13          }
14          System.out.println(a+","+b+","+c);
15      }
```

(a) No output-the code will not get compiled

The execution of this code shows 3 errors:

line 12 System.out.println (a+","+b+","+c); cannot find symbol variable c

line 14 System.out.println (a+","+b+","+c); cannot find symbol variable b

line 14 System.out.println (a+","+b+","+c); cannot find symbol variable c

(b)

There are 3 main syntax errors, the first one is in line 12, and the second one and the third one are in line 14.

First, in line 12, the statement "System.out.println (a+","+b+","+c);" tries to print the values of variables a, b and c. However, variable c is declared in block c and the scope of variable c is from the declaration statement of variable c (line 9) until the closing brace of the block (line 11). In other words, all the code that can get access to variable c is from line 9 to line 11. Therefore, the statement "System.out.println (a+","+b+","+c);" in line 12 cannot access the variable c and thus cannot get the value of variable c. This is why the error occurs in line 12.

In line 14, the statement "System.out.println (a+","+b+","+c);" tries to print the values of variables a, b and c. First, variable c is declared in block c and the scope of variable c is from the declaration statement of variable c (line 9) until the closing brace of the block (line 11). In other words, all the code that can get access to variable c is from line 9 to line 11. Therefore, the statement "System.out.println (a+","+b+","+c);" in line 14 cannot get access to variable c. Second, the variable b is declared in block b and the scope of variable b is from the declaration statement of variable b (line 6) until the closing brace of the block (line 13) including any nested statement blocks that follow the declaration. In other words, all the code that can get access to variable bis from line 6 to line 13. Therefore, the statement "System.out.println (a+","+b+","+c);" in line 14 cannot get the value of variable b.I n

conclusion, the statement "System.out.println (a+","+b+","+c);" in line 14 cannot get the value of variable c and variable b, thus resulting in the two errors in line 14.

The following is the code that I have revised:

```
public class Test{
    public static void main(String[] args) {
        //block a
        int a=10;
        {
            //block b
            int b=20;
            {
                //block c
                int c=30;
                System.out.println(a+","+b+","+c);
            }
            int c=30;
            System.out.println(a+","+b+","+c);
        }
        int b=20;
        int c=30;
        System.out.println(a+","+b+","+c);
    }
}

Then, the output is:
10,20,30
10,20,30
10,20,30
```

Question 3 (2 marks)

- What is the output of this piece of code?

```
1        boolean flag=true,exp1,exp2;
2        int x=10;
3        double y=-2.4;
4
5        exp1=(x>4&&!flag) ||(x==10 && !(!flag));
6        exp2=(y%2==1 && !flag) && (y<0 || (x+y)>5);
7        System.out.println(exp1);
8        System.out.println(exp2);
```

The output of this piece of code is:

true

false

For exp1:

x>4 is true, !flag is false, x==10 is true, !(!flag) is true. Then, we can simplify the code as:

exp1=(true&&false)||(true&&true);

The code above can be further simplified as exp1=(false||true);

Therefore, the statement "System.out.println(exp1);" will produce the output: true.

For exp2:

y%2==1 is false, !flag is false, y<0 is true, (x+y)>5 is true. Then, we can simplify the code as:

exp2=(false&&false)&&(true||true);

The code above can be further simplified as exp2=(false&&true);

Therefore, the statement "System.out.println(exp2);" will produce the output: false.