Tutorial -4

Question:

1. Explain the block concept in the blockchain technology.

2. Given the class diagram in Figure 1. Implement the Block, Header and Transaction classes.
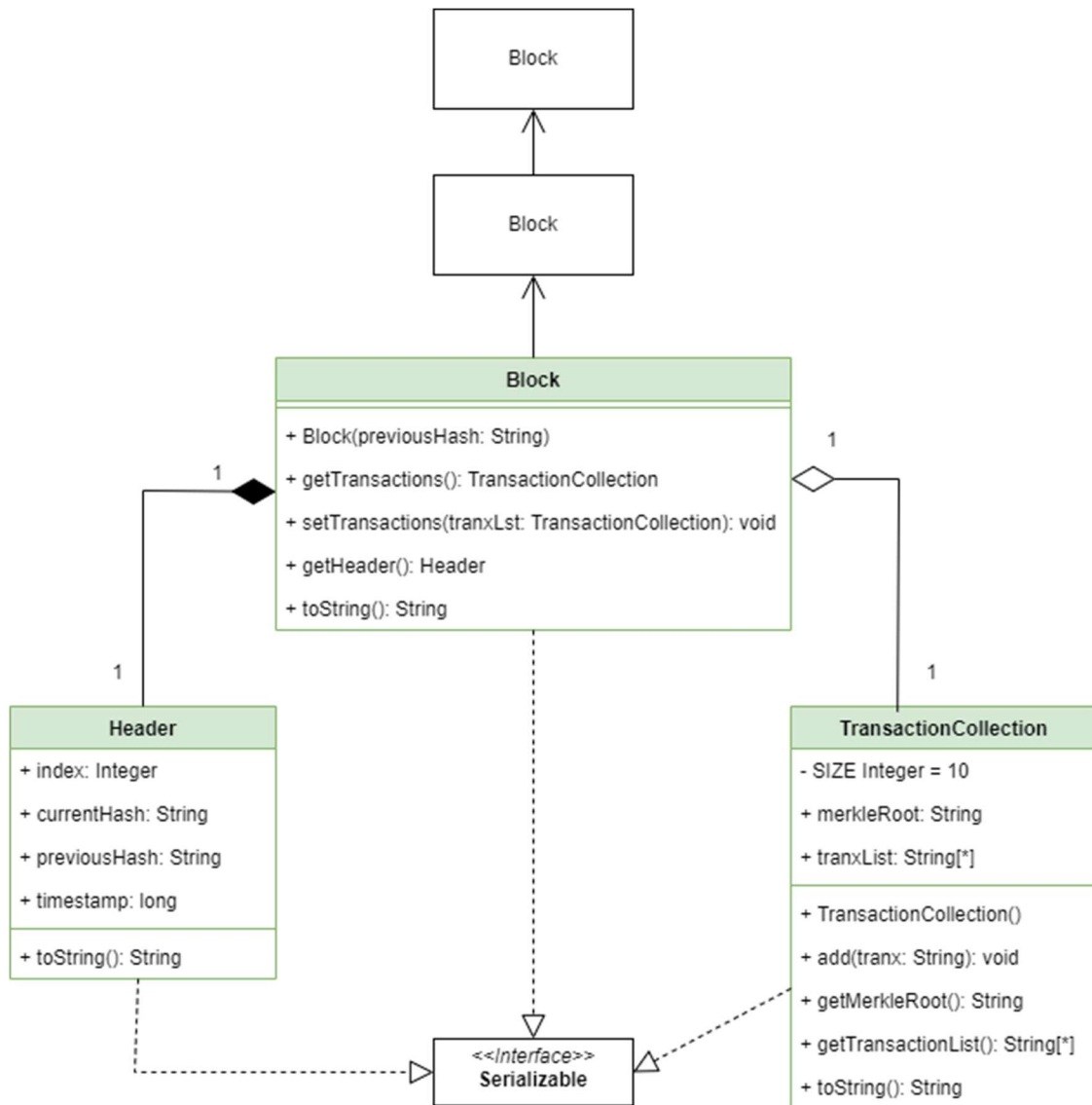

Figure 1: Block concept

Note: *You are required to implement the accessor and mutator methods accordingly.*

3. Insert the following code in the Block, Header and Transaction classes.

```
private static final long serialVersionUID = 1L;
```

Note: the serialVersionID value is used to facilitate the serialization purpose.

4. Implement the Block constructor method as follows:

```java
public Block( String previousHash ) {
    header = new Header();
    header.setTimestamp( new Timestamp(System.currentTimeMillis()).getTime() );
    header.setPrevHash(previousHash);
    String info = String.join("+", Integer.toString(header.getIndex()),
            Long.toString(header.getTimestamp()), header.getPrevHash());
    String blockHash = Hasher.sha256( info );
    header.setCurrHash( blockHash );
}
```

Note: *You can also modify the info to include merkleroot value – this feature will be followed up in coming tutorial lab later.*

5. Test your program using the code snippets below.

```java
//very-first block called genesis block
Block genesis = new Block("0");
System.out.println( genesis );

String tranx1 = "alice|bob|debit|rm|10";
String tranx2 = "helen|bob|debit|rm|20";

TransactionCollection tranxLst = new TransactionCollection();
tranxLst.add(tranx1);
tranxLst.add(tranx2);

//block-1
Block b1 = new Block(genesis.getHeader().getCurrentHash());
b1.setTransactions(tranxLst);
System.out.println( b1 );
```