

## MTP 2010

### Network Programming in Java

#### Exercises

1. Write a TCP client/server system in which the client program sends two numbers to a server program which returns the sum of the two numbers.
2. Write a UDP client/server system in which the client program sends a number between 1 and 10 and the server program returns the corresponding element in an array of strings.

You might find the following static methods useful:

```
public static byte[] intToByteArray(int value) {
    byte[] b = new byte[4];
    for (int i = 0; i < 4; i++) {
        int offset = (b.length - 1 - i) * 8;
        b[i] = (byte) ((value >>> offset) & 0xFF);
    }
    return b;
}
```

```
public static int byteArrayToInt(byte[] b, int offset) {
    int value = 0;
    for (int i = 0; i < 4; i++) {
        int shift = (4 - 1 - i) * 8;
        value += (b[i + offset] & 0x000000FF) << shift;
    }
    return value;
}
```

3. Write a client/server system in which each of any number of copies of a client program can send a message to a server program which re-broadcasts the message to all the clients in a multicast group.