WEEKS 1.4, 1.5

COMMUNICATION CIRCUITS

For reliable communications to take place in a system, the physical method of signalling, the encoding of information on to the signals and the protocols facilitating data exchange must first be established. Here, you will try to create a simple, fast and reliable communication system using common materials and your creativity.

🕐 You have one 2-hour session to design your communication system and prepare a poster. In the second 2-hour session (next week), you will have 30 minutes of "tinkering time" before you start presenting your system to your colleagues and tutors

WEEK 1.4

1. Form **groups of four**

2. Make sure you have all the components. If not, go back to the technicians' counter.

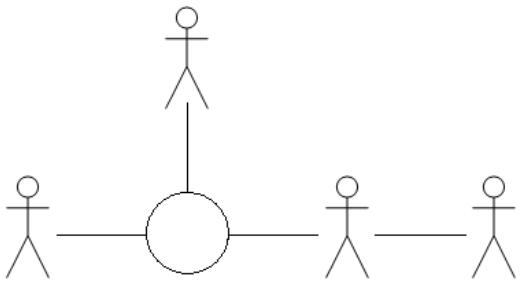
- ☐ Low-voltage power supply
- ☐ Copper wire
- ☐ Electrical switches
- ☐ Light bulbs and bulb cases
- ☐ Screwdriver
- ☐ Terminal Block
- ☐ Wire cutters
- ☐ Wire strippers

Do not touch the power supply before the safety briefing. It is potentially dangerous equipment that needs to be used carefully.

3. To get you started, first create the most basic circuit of a single light bulb controlled with a single switch.

The maximum voltage of the bulbs is **5 V**. If they look too bright, lower the voltage or you will destroy them!

4. Create an electrical network with the conceptual communication topology on the right.
- Agree standards on the physical method of signalling, encoding
- Design protocols to enable communication
Consider issues such as addressing, error correction and flow control.
During the communication, spoken, written, or nonverbal communication of any kind, is not allowed. The only communication allowed is over the physical wire.
The users cannot see each other's light bulbs.



The aim is to communicate as much data, as quickly and with as few errors as possible.

5. Create an A2 poster (using four A4 sheets) detailing:
- Network diagram (identifying connectivity)
- Details of standards used for the physical method of signalling, encoding and communication protocol.
- Analysis of the system relative to the OSI (page 4)

*Before your next lab starts, **all** students need to convert their team's poster into **PDF format** and upload it into **week 1.5** individually. Include all names of your team's members on your poster.*

WEEK 1.5

🕛 6. You have 30 minutes to rebuild and tinker with your system. In the meantime, the tutor will issue your group with a lettered card identifying your group, which you should put beside your poster.

7. Your group will give a demonstration of your system working and a short (up to 4 minutes) presentation of the key features and limitations of your communication system

8. Your group will attend the other groups' presentations, mark their work and write feedback for them

You will be evaluated for the appropriateness of your marks and the quality of your feedback

Communication Circuits - Marking Scheme

http://staffweb.cms.gre.ac.uk/~sp02/communicationcircuits/MarkingScheme.htm

	Registration Number	Surname	Forename
Student 1			
Student 2			
Student 3			
Student 4			

Laboratory day and time		Your group's letter	

Your tutor will organise you into groups, such that you will watch a number of demonstrations from your peers and review their posters. Discuss in your own group, what mark your peer's groups should be awarded. You cannot mark your own group. Hand in the completed mark sheet to the tutor.

Group	Comment	Mark (out of 10)
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
M		
N		
O		
P		
Q		
R		
S		
T		

Open Systems Interconnection (OSI) model

Application Layer	Provides programs with access to network services
Presentation Layer	Handles data representation to the application and data conversions. Ensures that data is readable by the receiving system. Handles encryption/decryption
Session Layer	Establishes, maintains, and coordinates communication between applications.
Transport Layer	Ensures reliable delivery of data. Breaks data into segments. Handles sequencing and acknowledgements and provides flow control
Network Layer	Handles packet routing. Logical addressing, and access control through packet inspection
Data Link Layer	Provides physical addressing, device-to-device delivery of frames, media access control, and MAC addresses
Physical Layer	Manages hardware connection, Handles sending and receiving binary signals, Handles encoding of bits