# Homework 2 Packet switching and routers Answers

1. Data are sent across a network using a method called packet switching.  
   1. Explain what is meant by the term ‘packet switching’. [3]

Message is split into packets / chunks;

Each packet is given destination and source IP addresses;

Each packet is dispatched to the Internet through a router or gateway;

Packets are sent independently;

Packets are given a sequence number;

Routers forward packets towards the destination node;

Path of transfer determined by routers;

Packets reassembled at destination node;

* 1. A packet contains a header and a trailer.   
     + - 1. The header contains a hop limit or Time To Live value. Explain with reference to the hop limit, how a packet may fail to arrive at its intended destination. [2]  
            Packets are passed from router to router as they traverse a network;

Each forwarding by (or transfer across) a router counts as one hop;

The TTL is decreased by 1 at each hop until zero is reached; at which point the packets will expire.

* + - * 1. A checksum is included in the packet trailer. Explain how the destination node can use a checksum to detect errors in transmission. [2]

A checksum is calculated using the payload data;

The same checksum is recalculated at the destination node;

If the two match, data is accepted and deemed not have changed;

If they do not match, data is rejected, deemed corrupted or altered.

* 1. Explain why the sender’s address is included in the packet header. [2]

The IP address of the sender is included in order to identify the sender;

to send a request back to the sender for a duplicate copy of the packet if it contains data transmission errors;

or to notify the sender if the packet cannot be delivered;

Firewalls also use the sender’s IP address in their packet filtering;

1. Packets are forwarded from one node to another in a network. These may be routers or gateways. Briefly describe the difference between a router and a gateway. [1]

A router operates between two networks using the same protocols;  
A gateway connects two networks using different protocols;

[Total 10 Marks]