

- 1 Video is streamed over networks and the internet at different bit rates. Fig. 1 shows a summary of the bit rates that are usually required for various video resolutions. Fig. 2 shows the bandwidths that are typically available over different mobile (cell) phone connections.

Output video resolution (pixels)	Bit rate (Mbits/s)
320 × 240	0.4
480 × 270	0.7
1024 × 576	1.5
1280 × 720	2.5
1920 × 1080	4.0

Type of mobile connection to network/internet	Typical maximum bandwidth available for download (Mbits/s)
3G mobile connection	0.31
4G mobile connection	15
Bluetooth® 1.1 connection	0.5
Wi-Fi (IEEE 802.11g) wireless connection	54

Fig. 1

Fig. 2

Using all the information in Fig. 1 and Fig. 2, explain how the viewing experience of a streamed video displayed on a mobile (cell) phone screen of resolution 1024 × 576 pixels is affected by bit rate and available bandwidth.

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- 2 The use of JavaScript within the HTML code of a web page allows the page to react to user intervention.
The code below contains a function named *checkreadpagefunction* that will ask the user to confirm that the page has been read.

Complete the JavaScript code by writing extra code that will capture the click event and execute the function.

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<html>
<body>
<p>Click on the button to confirm that you have read this page.</p>
<button id="button1">Click here</button>
<script>
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```
function checkreadpagefunction() {
    alert ("I have read this page.");
}
</script>
</body>
</html>
```

You may use the space below for any rough work.

3 Fig. 3 shows a switched network with computers at **A**, **B**, **C** and **D**. S1, S2, S3, S4, S5 and S6 are switches. A message is being sent between computers at **A** and **B**. The whole message is sent at once along the route shown by the arrows.

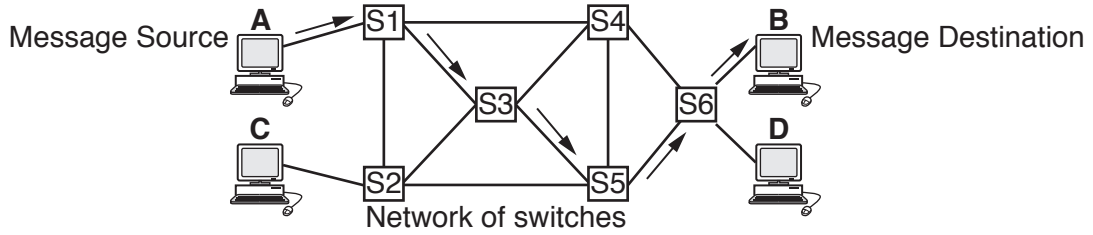


Fig. 3

(a) Explain, with reference to Fig. 3, why this method of sending a message by the route shown is often called 'store and forward'.

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(b) Describe **two** advantages of using the 'store and forward' method to send a message over this network.

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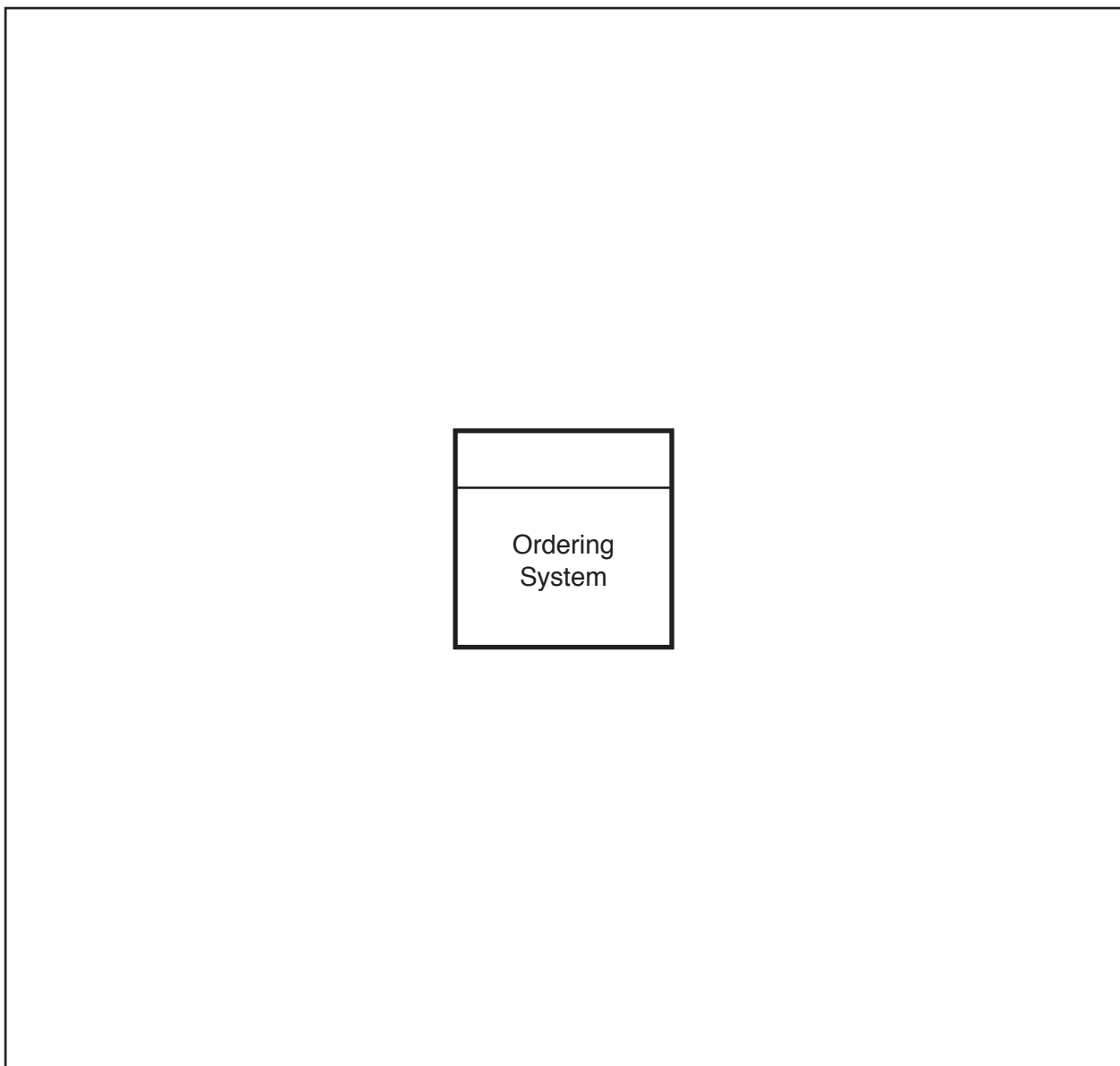
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[2]

5 RockICT Sales sells hats to customers direct from its warehouse. It has a centralised ordering system that is linked to the warehouse and accounts systems. When a customer orders a hat, the system:

- takes the orders from the customer
- checks the stock status with the warehouse
- sends messages to the customer advising of the status of the order
- sends out a request for payment and processes the payment
- requests the shipping of the hat from the warehouse
- receives a shipping confirmation and a stock inventory update from the warehouse
- sends stock inventory and payment updates to the accounts.

Draw a Level 0 (context level) Data Flow Diagram of the system to show the external entities and the data flow between these and the ordering system. The ordering system has been drawn in the centre of this box for you.



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7 Describe how holographic optical disk storage technology uses lasers to store vast amounts of data.

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