

## Communication and Internet technologies

Candidates should be able to:

### 1.2.1 Serial and parallel data transmission

- show understanding of what is meant by transmission of data
- distinguish between serial and parallel data transmission
- show understanding of the reasons for choosing serial or parallel data transmission
- show understanding of the need to check for errors
- explain how parity bits are used for error detection
- identify current uses of serial and parallel data transmission, such as Integrated Circuits (IC) and Universal Serial Bus (USB)

### 1.2.2 Security aspects

- show understanding of the security aspects of using the Internet and understand what methods are available to help minimise the risks
- show understanding of the Internet risks associated with malware, including viruses, spyware and hacking
- explain how anti-virus and other protection software helps to protect the user from security risks (this also links into section 1.4 of the syllabus)

### 1.2.3 Internet principles of operation

- show understanding of the role of the browser and Internet server
- show understanding of what is meant by hypertext transfer protocol (http) and HTML
- distinguish between HTML structure and presentation
- show understanding of the concept of MAC address, Internet Protocol (IP) address and cookies

## DATA TRANSMISSION

- Data transmission refers to the movement of data in form of bits between two or more digital devices.
- This transfer of data takes place and some form of transmission media.

## DATA TRANSMISSION TYPES

- Parallel
- Serial

### PARALLEL TRANSMISSION

- In parallel transmission, all the bits of data are transmitted simultaneously on separate communication lines.
- Parallel transmission is used for short distance communication.
- In order to transmit n bit , n wires or lines are used.
- More costly.
- Faster than serial transmission.
- Data can be transmitted in less time.

### SERIAL TRANSMISSION

- In serial transmission, the various bits of data are transmitted serially one after the other.
- It requires only one communication line rather than n lines to transmit data from sender to receiver.
- Thus all the bits of data are transmitted
- on single lines in serial fashion.
- Less costly.
- Long distance transmission.

## TRANSMISSION MODE

The term transmission mode defines the direction of the flow of information between two communication devices i.e.,

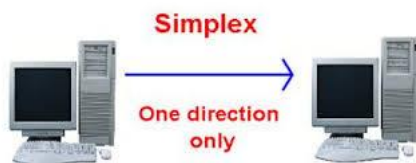
It tells the direction of signal flow between the two devices.

## TYPES OF TRANSMISSION MODE

1. SIMPLEX TRANSMISSION MODE.
2. HALF DUPLEX TRANSMISSION MODE
3. FULL DUPLEX TRANSMISSION MODE.

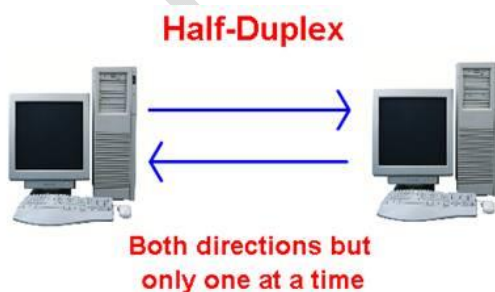
### SIMPLEX MODE

- In simplex mode transmission information
- Sent in only one direction.
- Device connected in simplex mode is either sent only or received only that is one device can only send, other device can only receive.
- Communication is unidirectional.



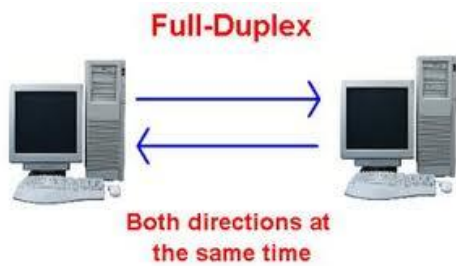
### HALF DUPLEX

- In half duplex transmission data can be sent in both the directions, but only in one direction at a time.
- Both the connected device can transmit and receive but not simultaneously.
- When one device is sending the other can only receive and vice-versa.



## FULL DUPLEX

- In full duplex transmission, data can be sent in both the directions simultaneously.
- Both the connected devices can transmit and receive at the same time.
- Therefore it represents truly bi-directional system.
- In full duplex mode, signals going in either
- Directions share the full capacity of link.



## Cookie

A **cookie**, also known as an **HTTP cookie**, **web cookie**, **Internet cookie**, or **browser cookie**, is a small piece of data sent from a website and stored in a user's web browser while the user is browsing that website. Every time the user loads the website, the browser sends the cookie back to the server to notify the website of the user's previous activity.<sup>[1]</sup> Cookies were designed to be a reliable mechanism for websites to remember stateful information (such as items in a shopping cart) or to record the user's browsing activity (including clicking particular buttons, logging in, or recording which pages were visited by the user as far back as months or years ago).

**Phishing** is the attempt to acquire sensitive information such as usernames, passwords, and credit card details (and sometimes, indirectly, money) by masquerading as a trustworthy entity in an electronic communication.

**Pharming**<sup>[p]</sup> is a cyber attack intended to redirect a website's traffic to another, fake site. Pharming can be conducted either by changing the hosts file on a victim's computer or by exploitation of a vulnerability in DNS server software. DNS servers are computers responsible for resolving Internet names into their real IP addresses. Compromised DNS servers are sometimes referred to as "poisoned". Pharming requires unprotected access to target a computer, such as altering a customer's home computer, rather than a corporate business server.

**Spyware** is software that aids in gathering information about a person or organization without their knowledge and that may send such information to another entity without the consumer's consent, or that asserts control over a computer without the consumer's knowledge.<sup>[1]</sup>

**Malware**, short for **malicious software**, is any software used to disrupt computer operation, gather sensitive information, or gain access to private computer systems.<sup>[1]</sup> Malware is defined by its malicious intent, acting against the requirements of the computer user, and does not include software that causes unintentional harm due to some deficiency. The term *badware* is sometimes used, and applied to both true (malicious) malware and unintentionally harmful software.<sup>[2]</sup>

**Electronic spamming** is the use of electronic messaging systems to send unsolicited messages (**spam**), especially advertising, as well as sending messages repeatedly on the same site.

**Wardriving** is the act of searching for Wi-Fi wireless networks by a person in a moving vehicle, using a portable computer, smartphone or personal digital assistant (PDA).

## Internet Protocol address (IP address)

An **Internet Protocol address (IP address)** is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication.

## Media access control address (MAC address)

A **media access control address (MAC address)** is a unique identifier assigned to network interfaces for communications on the physical network segment.

## What is the Internet?

A network of networks – an inter-network, or Internet

## What are Internet protocols?

The rules for transferring information between programs

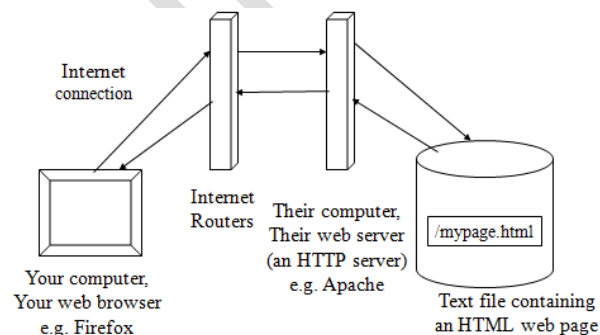
- HTTP - hypertext transfer protocol
- FTP - file transfer protocol
- SMTP – simple mail transfer protocol

## What is the World Wide Web?

A set of HTML pages accessible using the HTTP protocol

## How does a Web Browser (Firefox) fit in this picture?

- your browser connects, using the HTTP protocol, to a web server
- the web server fetches an HTML web page and sends the HTML to your browser
- your browser turns the HTML page into a nice-looking page on your screen



## Hyper Text Markup Language (HTML) Basics

- HTML is a “mark-up language”
  - You add the mark-up tags to your text document
- Now follows a published standard via <http://w3c.org/>
- HTML is a language of mark-up “tags” in angle brackets: <>
  - each tag has a name and may have one or more quoted attributes
  - eg. **<p class="thesis" style="color: red">**
- Tags usually come in pairs (with some exceptions)
  - <html>...</html>, <body>...</body>, <p>...</p>, <hr>, <br>
- Web pages are free-form input; line breaks can be used most anywhere and don't affect the appearance of the document
  - Yes, your entire page could be a single line of text!

Must see the link for HTML

[www.w3schools.com](http://www.w3schools.com)

### That's all you need for a basic web page!

```
<!DOCTYPE HTML PUBLIC
```

```
"-//W3C//DTD HTML 4.01//EN"
```

```
"http://www.w3.org/TR/html4/strict.dtd">
```

```
<html>
```

```
<head>
```

```
<title>My Title</title>
```

```
</head>
```

```
<body>
```

```
<p>This is my first web page.</p>
```

```
</body>
```

```
</html>
```

## 2.1 Algorithm design and problem-solving

**LOGO LANGUAGE  
WORKSHEETS**

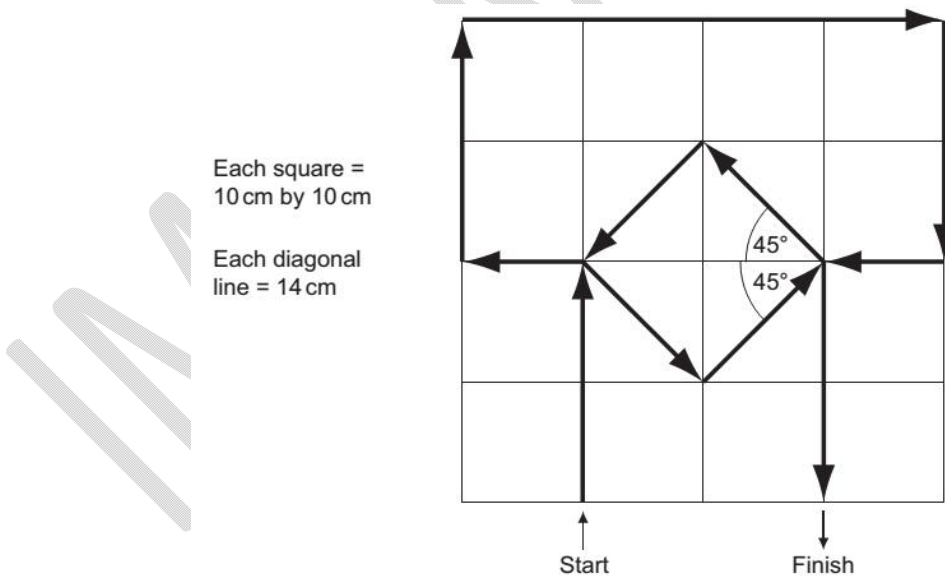


May/June 2012

Q1)

A floor turtle can use the following instructions.

Instruction	Meaning
FORWARD $x$	Move $x$ cm forwards
LEFT $t$	Turn left $t$ degrees
RIGHT $t$	Turn right $t$ degrees
REPEAT $n$	Repeat next set of instructions $n$ times
ENDREPEAT	Finish repeated instructions
PENUP	Lift the pen
PENDOWN	Lower the pen

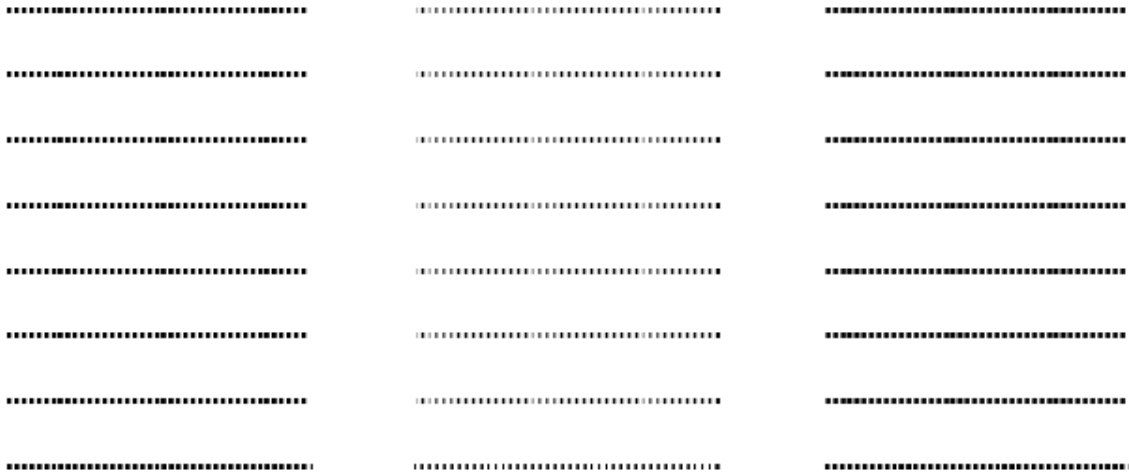


Complete the set of instructions to draw the above shape in the direction shown by the arrows.

PENDOWN

FORWARD 20

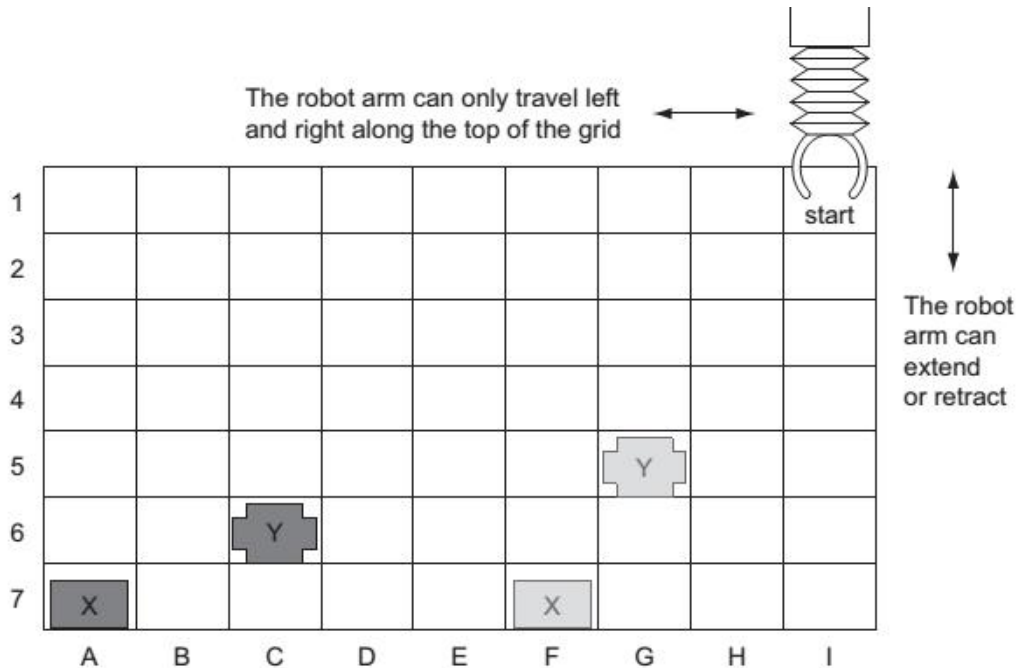
LEFT 90



[5]

**October/November 2006**

Q2) A robot arm is to be used to move some objects which are positioned on the grid shown. Object "X" is located at A7 and is to be moved to F7. Object "Y" is located at C6 and is to be moved to G5. The START position for the robot arm is shown. The robot arm can travel left and right along the top of the grid, and the robot arm can extend (lengthen) and retract (shorten) so that the gripper at the end of the arm can reach any grid square.



The following commands must be used:

Instructions for Robot Arm	
Right $n$	Moves $n$ squares to the right
Left $n$	Moves $n$ squares to the left

Instructions for Robot Arm	
Down $n$	Moves $n$ squares down (extend)
Up $n$	Moves $n$ squares up (retract)
Close	Closes the gripper
Open	Opens the gripper

For example, to move block “X” from square A7 to F7 (beginning at START) would require the following instructions:

- Left 8**
- Down 6**
- Close**
- Up 6**
- Right 5**
- Down 6**
- Open**

Write a set of instructions to transfer block "Y" from C6 to G5 (beginning at START)

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IMRAN KHAN

# ANSWER KEYS

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IMRAN KHAN

# LOGO LANGUAGE WORKSHEETS

Q1)

pendown

forward 20

left 90

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forward 10

right 90 (1 mark)

forward 20

-----

right 90

forward 40

right 90 (1 mark)

forward 20

right 90

-----

forward 10

right 45 (1 mark)

forward 14

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repeat 3 or left 90

left 90 or forward 14

forward 14 or left 90

endrepeat or forward 14 (1 mark)

left 90

forward 14

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right 135

forward 20 (1 mark)

(PENUP) [5]

Q2)

LEFT 6 }

DOWN 5 } 1 mark

CLOSE }

UP 5 } 1 mark

RIGHT 4 }

DOWN 4 } 1 mark

OPEN }

[3]