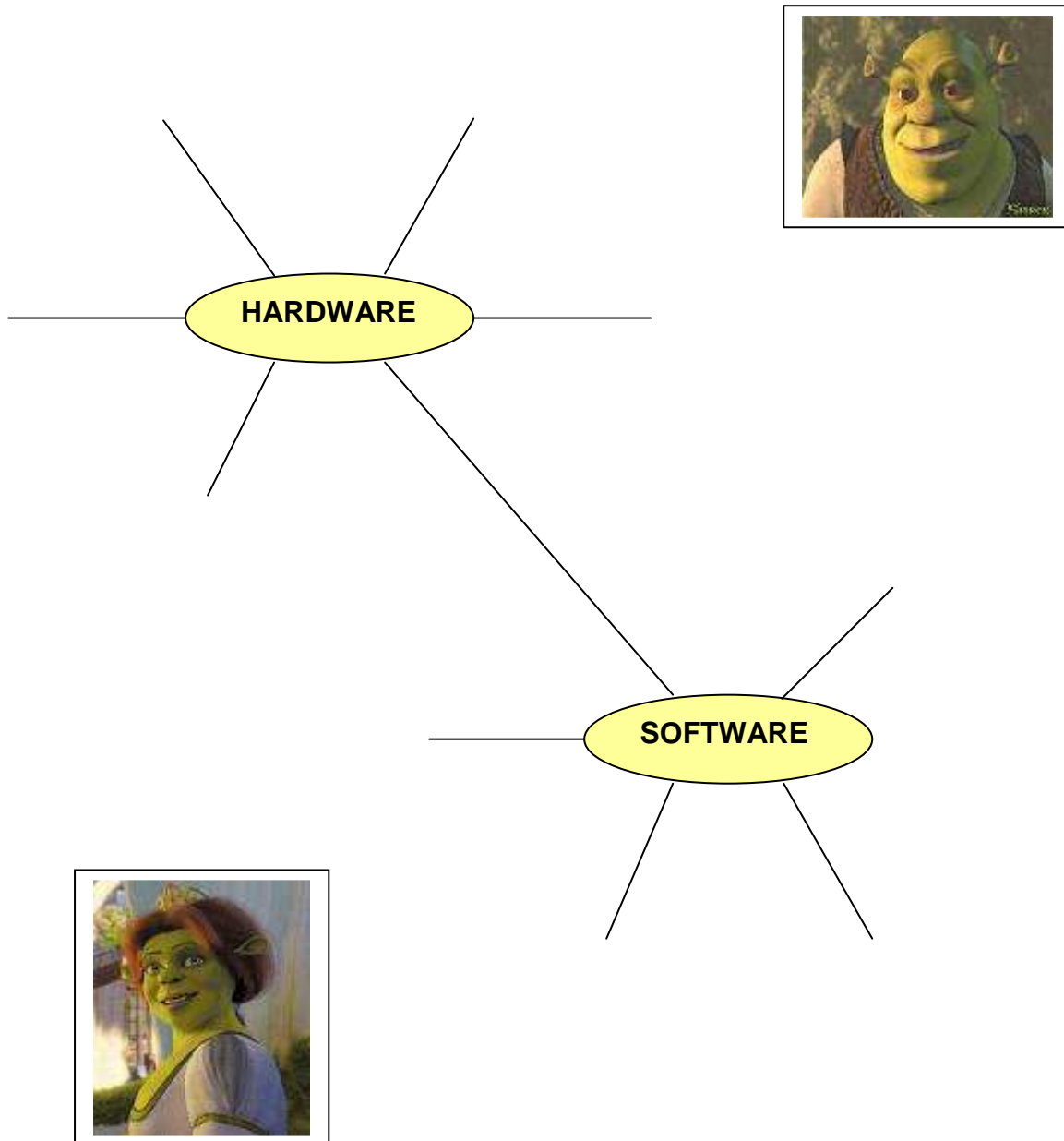# UNIT 2 SOFTWARE

Ask me about

Free Software

It's all about freedom.

The hardware is the body, the software is the soul.

@ctivity 2.1

- Write on the board the words HARWARE and SOFTWARE
- Tell the difference between them
- Write some words related to them and do a concept map
- What's the meaning of the line that links both together?

HARDWARE

SOFTWARE

@ctivity 2.2

Match these words in the box with the examples of different codes that are given on the table below.

Braille, Roman numbers, Binary code, Bar code, Morse code, Egyptian hieroglyphics, ASCII code, Post code

EXAMPLES	CODES
10011011	
A . _ J . _ _ _ S . . . 2 . . _ _ _ B _ . . . K _ . _ T _ 3 . . . _ _ C _ . _ . L . _ . . U . . _ 4 . . . . _ D _ . . M _ _ V . . . _ 5 . . . . . E . N _ . W . _ _ 6 _ . . . . F . . _ . O _ _ _ X _ . . _ 7 _ _ . . . G _ _ . P . _ _ . Y _ . _ _ 8 _ _ _ . . H . . . . Q _ _ . _ Z _ _ . . 9 _ _ _ _ . I . . R . _ . 1 . _ _ _ _ 0 _ _ _ _ _	
a b c d e f g h i j k l m n o p q r s t u v w x y z	
1 25002 74135 0	
08450	

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
128	80	Ç	160	A0	á	192	C0	└	224	E0	α
129	81	ü	161	A1	í	193	C1	┴	225	E1	β
130	82	é	162	A2	ó	194	C2	┬	226	E2	Γ
131	83	â	163	A3	ú	195	C3	├	227	E3	π
132	84	ä	164	A4	ñ	196	C4	─	228	E4	Σ
133	85	à	165	A5	Ñ	197	C5	┼	229	E5	σ
134	86	å	166	A6	ª	198	C6	╞	230	E6	µ
135	87	ç	167	A7	º	199	C7	╟	231	E7	τ
136	88	ê	168	A8	¿	200	C8	╚	232	E8	Φ
137	89	ë	169	A9	⌐	201	C9	╔	233	E9	Θ
138	8A	è	170	AA	¬	202	CA	╩	234	EA	Ω
139	8B	ï	171	AB	½	203	CB	╦	235	EB	δ
140	8C	î	172	AC	¼	204	CC	╠	236	EC	∞
141	8D	ì	173	AD	¡	205	CD	═	237	ED	φ
142	8E	Ä	174	AE	«	206	CE	╬	238	EE	ε
143	8F	Å	175	AF	»	207	CF	╧	239	EF	∩
144	90	É	176	B0	░	208	D0	╨	240	F0	≡
145	91	æ	177	B1	▒	209	D1	╤	241	F1	±
146	92	Æ	178	B2	▓	210	D2	╥	242	F2	≥
147	93	ô	179	B3	│	211	D3	╙	243	F3	≤
148	94	ö	180	B4	┤	212	D4	╘	244	F4	⌠
149	95	ò	181	B5	╡	213	D5	╒	245	F5	⌡
150	96	û	182	B6	╢	214	D6	╓	246	F6	÷
151	97	ù	183	B7	╖	215	D7	╫	247	F7	≈
152	98	ÿ	184	B8	╕	216	D8	╪	248	F8	°
153	99	Ö	185	B9	╣	217	D9	┘	249	F9	∙
154	9A	Ü	186	BA	║	218	DA	┌	250	FA	·
155	9B	¢	187	BB	╗	219	DB	█	251	FB	√
156	9C	£	188	BC	╝	220	DC	▄	252	FC	ⁿ
157	9D	¥	189	BD	╜	221	DD	▌	253	FD	²
158	9E	₧	190	BE	╛	222	DE	▐	254	FE	■
159	9F	ƒ	191	BF	┐	223	DF	▀	255	FF	
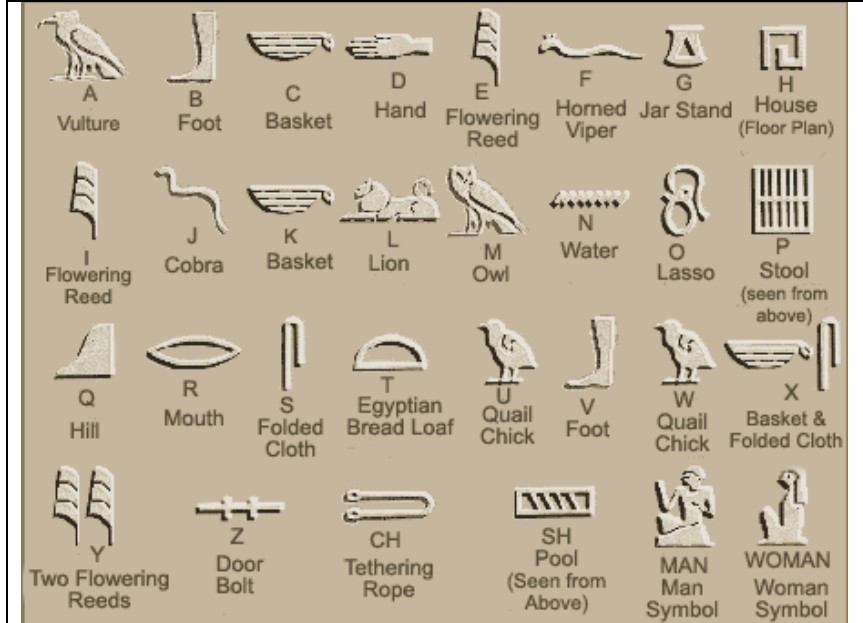
$$IV + III = VII$$

@ctivity 2.3

Tell me 2 or 3 things you know about data compression:
- What does it do?
- What's an example?
- Why is it important?

Look for answers in the text.

COMPRESSION

Compression tries to reduce the size of a file by removing redundant data within the file. By making files smaller, less disc space is used, and more files can be stored on disc.

For example, a 100 KB text file might be compressed to 52 KB by removing extra spaces or replacing long codes with short ones.

A procedure recreates the original data when the file is read. Picture and video files are also compressed. For example, the .jpg image file format uses compression to eliminate redundant pixel data.

Compression is very important in communications when data is sent to a remote place (i.e. using internet) because smaller size files take less time to be sent. In other words, more information can be sent in the same amount of time.

@ctivity 2.4

In 3 minutes predict in pairs:
- What does encryption do?
- How does it work?
- What could be the problem?

Look for answers in the text and compare them with your predictions.

ENCRYPTION

Encryption is used to protect data, preventing unauthorized users from accessing information even if files are hacked or stolen.

Encryption uses a mathematical procedure with a unique key to encode a file into a form that cannot be read.

No one else can access or use the encrypted file until it is unencrypted again using the identical key. Of course, if the encryption key is lost or forgotten, any data encrypted with that key will be inaccessible.

@ctivity 2.5

In your computer go to **START** , then **SEARCH** , select **PICTURES, MUSIC AND VIDEO**, tick on ☑ **MUSIC**, and look in your computer for one file of each of the four types shown in the table.

For example, you have to type *****.wav** and then click on   **Search** .

In the table:

- Write the file name you have just found

- Write the file size in Kilobytes (KB)

- Play the music file and write down the duration (mm:ss)

- Calculate the ratio size / duration in KB / min

- Answer if it's a compressed data file or if it's not

FILE NAME	EXTENSION	SIZE (KB)	DURATION (mm:ss)	RATIO (KB / min)	COMPRESSED DATA (Y / N)
	.WAV				
	.MP3				
	.WMA				
	.MID				

Key concepts :

ALGORITHM
A set of well-defined rules or procedures for solving a problem in a finite number of steps.

INSTRUCTION
It is a single operation of a computer processor. It is an element of an executable program, such as a byte code.

PROGRAM
It is a sequence of instructions that a computer can interpret and execute.

Programs could be divided into two groups:

OPERATING SYSTEMS	APPLICATIONS
An operating system (sometimes abbreviated "OS") is a set of programs that, after being initially loaded into the computer by a boot program, manage all the other programs in a computer.	The other programs are called applications or application programs and perform many different and specific functions. The application programs make use of the operating system by making requests for services and resources from the system.

Key functions of an operating system:

- In operating systems where multiple programs can run at the same time (multitasking), the operating system determines in what order applications should run and how much time is allowed for each application before another application has its turn.
- It manages the sharing of internal memory among multiple applications.
- It handles input and output to and from connected hardware devices, such as hard discs, printers, keyboard, monitor and communication ports.

Examples of operating systems:

DOS	That's the old Disc Operating System from IBM and Microsoft
UNIX	Originally from 1969 has evolved to a large freeware product
LINUX	Unix-based freeware operating system
WINDOWS XP WINDOWS VISTA	Nowadays Microsoft operating systems
Mac OS X	Apple Macintosh operating system version 10

@ctivity 2.6

Follow the 7 steps of the **PROGRAM** below. What's the result on the **SCREEN** after the steps (**...1** to **...7**)?

CPU: Central Processing Unit   **SCREEN**

ACCUMULATOR

REGISTERS

| A |
| B |
| C |
| D |

CONTROL

INPUT / OUTPUT

DATA BUS

ADDRESS BUS

MEMORY

ADDRESS	INFORMATION	
0	25	DATA
1	100	
2	60	
3	2540	
4	3,1416	
5		
....	....	
...1	Load the **ACCUMULATOR** with the data from memory address **0**	PROGRAM
...2	Load the **REGISTER A** with the data from memory address **1**	
...3	Load the **REGISTER B** with the data from memory address **2**	
...4	Add the data in the **REGISTER A** to the **ACCUMULATOR**. Result remains in **ACC**.	
...5	Subtract the data in the **REGISTER B** from the **ACCUMULATOR**. Put result in **ACC**.	
...6	Save the data in the **ACCUMULATOR** to memory address **5**	
...7	Display the data in memory address **5** on the **SCREEN**	
....	....	

@ctivity 2.7

- Put the corresponding number beside the statements to match the terms in the first column

- Students will read one term each and the corresponding statement to the class and their mates will tell him / her if it is correct.

TERMS	
MP3	1
DVD	2
JPG	3
PROGRAM	4
HACKER	5
MIDI	6
VBASIC	7
LINUX	8
VIRUS	9
ENCRYPT	10

	STATEMENTS
	Unix based freeware operating system
	Electronic instruments that can be connected to computers
	Language for writing a computer program
	Small program that infects your computer and reproduces itself
	Watching movies at home
	Compressed data format for saving pictures
	Converting data to secret code to make it secure
	Someone who tries to access a computer network system illegally
	Listening to music on your computer or from internet
	A sequence of computer instructions

Application programs:

@ctivity 2.8

- Divide the class in 2 teams (A , B). Hand out the table to the students
- In pairs students write 2 correct definitions and 2 wrong definitions using the table and the language frame provided
- Both teams turn the handout down
- Ask 2 or 3 pairs from team A to read out their 4 statements
- Team B listens and decides if they are true or false. Correct answers get 1 point.
- Then ask 2 or 3 pairs from team B and they do the same

SOFTWARE	FUNCTION
WORDPROCESSOR	Creating and editing texts
SPREADSHEET	Performing calculations using formulas and presenting data graphs
DATABASE	Storing data so it can be easily searched and sorted
GRAPHICS	Create and edit drawings and pictures
GAMES	Playing different sorts of games
PRESENTATION	Creating multimedia slide shows
INTERNET	Searching websites, chatting, sending messages, making phone calls and video conferencing
WEBSITE EDITOR	Creating and editing web pages
IMAGE EDITOR	Editing graphic images and pictures
DEVELOPER TOOLS	Writing and editing computer programs or applications
SOUND & VIDEO EDITOR	Editing sound and video files

X	is are	software	which	create perform store play search edit write	...

@ctivity 2.9

Write down any words you know (related to programs or files) connected with the types of software that are in the boxes below. After 5 minutes the teacher is going to read 20 more words and you have to write them down where they belong.

WORD PROCESSOR	SPREADSHEET

PRESENTATION	PICTURES

VIDEO	COMPRESSED DATA

PROGRAMMING	SOUND

EXECUTABLE FILES	DATA BASE
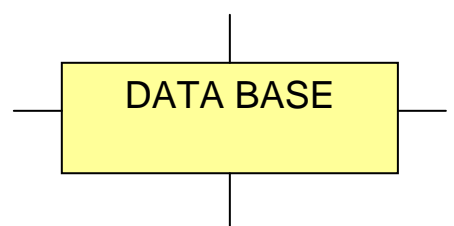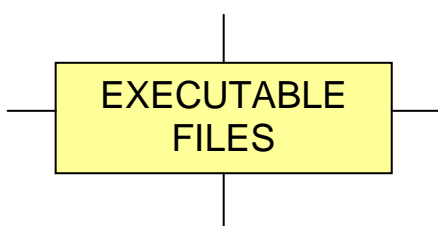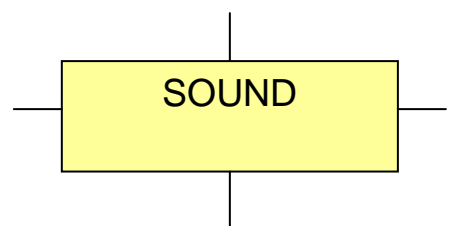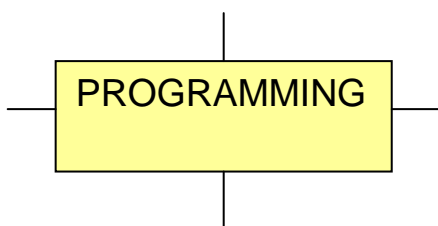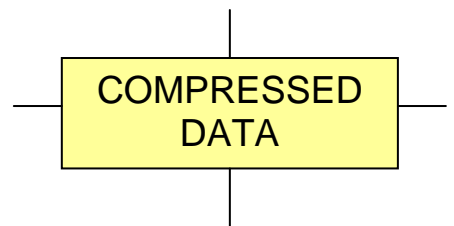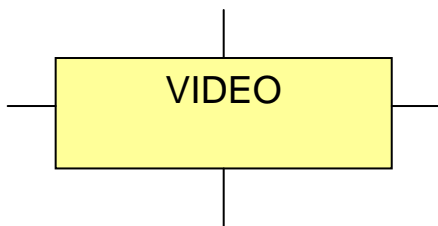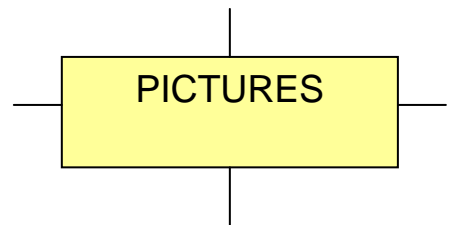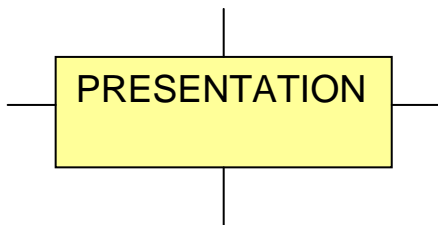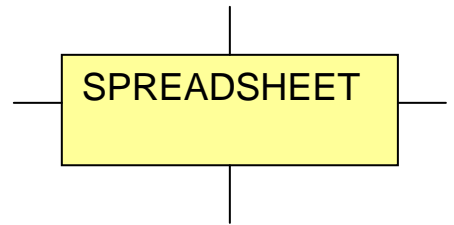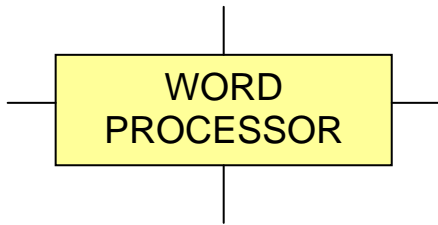
@ctivity 2.10

- Work in groups of three (A, B and C)
- Each student in the group chooses 3 different paragraphs from the text below
- Read and underline the words you don't know
- A, B and C write 3 questions as headings for their 3 paragraphs

1	Programming can be defined as the implementation of an algorithm in a computer language. This forms the basis of computer usage made up of two sections: information management and word processing.
2	Why is programming necessary? Why develop algorithms? Why not just use the software available? We have software for just about everything these days. Even software that generates code. The answers would require more questions. Who makes this software? How are they made?
3	To answer these questions I will have to take you back to the very basics of computers. A computer is, very simply, a set of input, output and memory devices connected to a processor, all of which are connected to a power source.
4	Programs have to use input devices to get data to the processor chip, access the memory and output devices and achieve the desired output.
5	The processor only accepts two kinds of inputs, one and zero: the binary code. In the earlier days where the output consisted mainly of punched cards, the input was also given in ones and zeros which is now known as the machine language.
6	But then as the hardware became more powerful and more complicated inputs were introduced, an interpreter called the assembler, that was stored in the memory, was developed. It was given instructions in written words that would then be translated to the corresponding machine language command (or commands) and passed on to the processor.
7	This was a cycle that led to more and more powerful computers and languages. But still the basis remains the same. Every language comes with an interpreter that converts the language to the machine language. The more advanced ones now have compilers, which make a file of all the interpreted machine language instructions called an executable (**.**exe) file.
8	Which language is the best is a rhetorical question. Each language has its advantages and disadvantages. The older ones (low level) are a lot more basic and take longer to code. But they execute faster and have greater capabilities such as interaction with registers, ports and system memory.
9	The high level languages are easier to use, have many built-in functions (which execute a large set of instructions at once) and are good for large projects. But for the basics of system programming, there's nothing like the assembler or maybe C.

Programming languages:

TYPES		EXAMPLES
LOW LEVEL	Binary codes or its derivatives, closer to the machine hardware	Machine code Machine language Binary code Hexadecimal code Assembler
HIGH LEVEL	More similar to our written and spoken languages, closer to human languages	Fortran (1954) BASIC (1963) Pascal (1970) Turbo Pascal C (1972) Logo Visual C++ Visual Basic SQL Java HTML PHP **...**

START

FULL UNDERSTANDING OF
THE PROBLEM AND
ITS INPUTS AND OUTPUTS

ALGORITHM DEVELOPMENT
WRITING **SOURCE CODE**
ADDING COMMENTS

EDITOR

TESTING AND DEBUGGING

DEBUGGER

PRODUCING **OBJECT CODE**
(**.**EXE FILE)

COMPILER

FINAL STRESS TEST
WRITING DOCUMENTATION

END
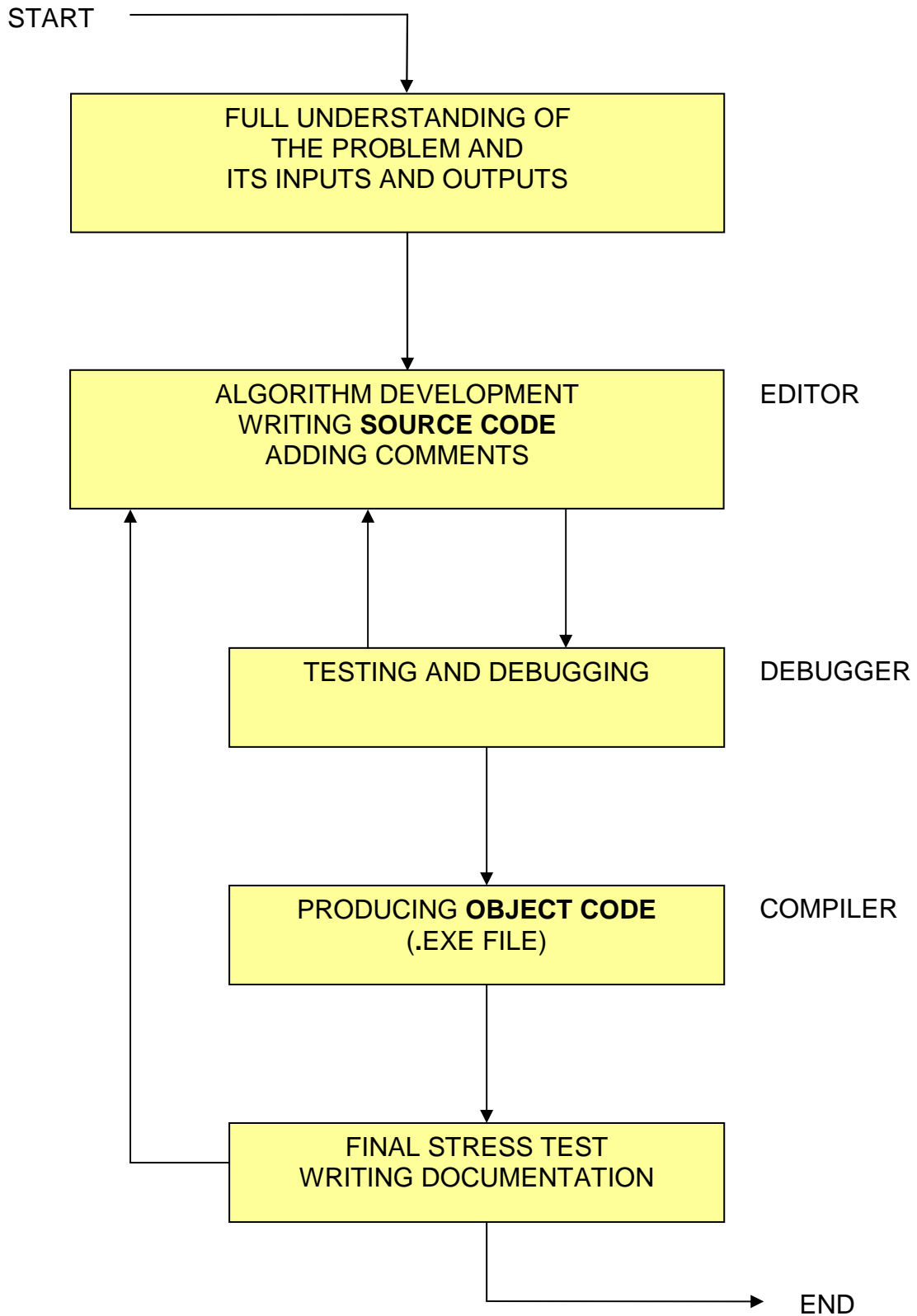
@ctivity 2.11

Look at the above diagram. What do you think it explains?

A/ a classification process   B/ a project writing process
C/ a programming process   D/ an object manufacturing process

Key concepts:

Editor
In computer science, it is a program that allows the user to write, modify and store programs as text files.

Debugger
A tool for tracing program execution that helps to detect software errors (bugs).

Translators
To get from your programming language down to the binary instructions the computer processor understands, some form of translation is required. Translators come in two general types:

- **Compiler:** Translates an entire program at one time then executes it.
    - Compiled programs execute much faster.
    - Compilation is usually a multi-step process.
    - Compilers do not require space in memory when programs run.

- **Interpreter:** Translates a program line at a time while executing.
    - Interpreted programs are slower because translation takes time.
    - Interpretation translates in one step.
    - Interpreters must be in memory while a program is running.

Programming steps reminder:

In all cases, when programming (whatever the language) remember the five steps to create a good program:

- Define the problem - Make clear statements – Understand it

- Plan the solution - Create a logical outline – Develop the algorithm / flowchart

- Code the program - Use the programming language - (EDITOR)

- Test the program - Try everything - (DEBUGGER – COMPILER)

- Document everything - Use comments and write a manual

Programming isn't hard, it just takes time!
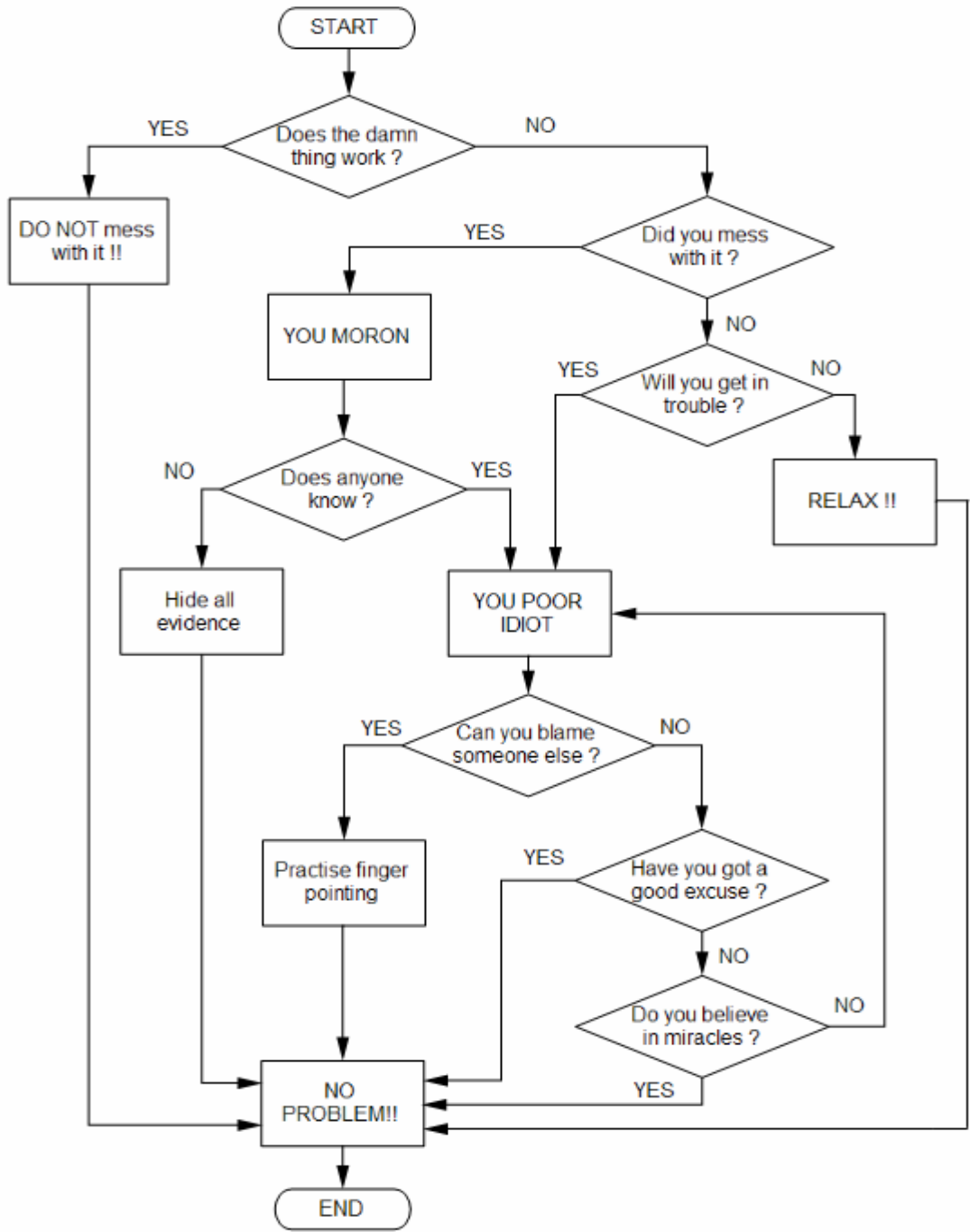
@ctivity 2.12
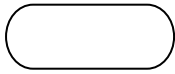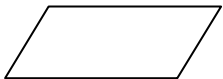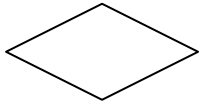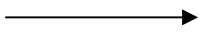
A/ Read and follow all the paths of the flow chart above. Underline the vocabulary you don't know.

B/ Find a route where you are caught in a loop and never get to the "NO PROBLEM!!" ending box.

C/ Tell the class one sentence each using what's written in the boxes and rhombus of the flowchart. Use this language frame:

If	[affirmative sentence] [negative sentence]	then	[+ or – sentence] [interrogative sentence]

Example: If you can blame someone else then practice finger pointing.

SYMBOLS	MEANING	NAME / DESCRIPTION
	TERMINATOR (START / END)	
	PROCESS, BASIC OPERATION	
	DATA INPUT / OUTPUT	
	DECISION	
	SUBPROGRAM, SUBRUTINE OR PROCEDURE	
	ON-PAGE CONNECTOR	
	OFF-PAGE CONNECTOR	
	FLOW OF EXECUTION	

@ctivity 2.13

A/ Match the symbols and meanings of the table above with the names and descriptions given below :

circle, arrow, rhombus, rectangle, rectangle with right and left rounded sides, rhomboid, rectangle with parallel lines on right and left sides, irregular pentagon

B/ In pairs choose 4 symbols and draw a repeated pattern. Show it to your partner and ask them to tell you the meaning of the symbols.

Basic algorithm structures:

A/ LINEAR OR SEQUENTIAL:
Steps or basic operations are done one after the other following a single row.

```
→  [ Task A ]  →  [ Task B ]  →  [ Task C ]  →
```
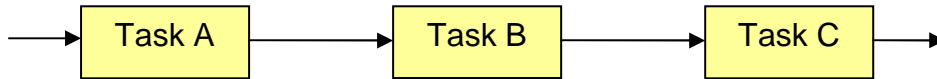
B/ CONDITIONAL (DECISION):
After a condition is met or not the program has to follow one path and not the other.

```
                 ↓
        YES   < ? >   NO
         ↓            ↓
     [ Task A ]    [ Task B ]
         ↓            ↓
            → ( ) ←
               ↓
```
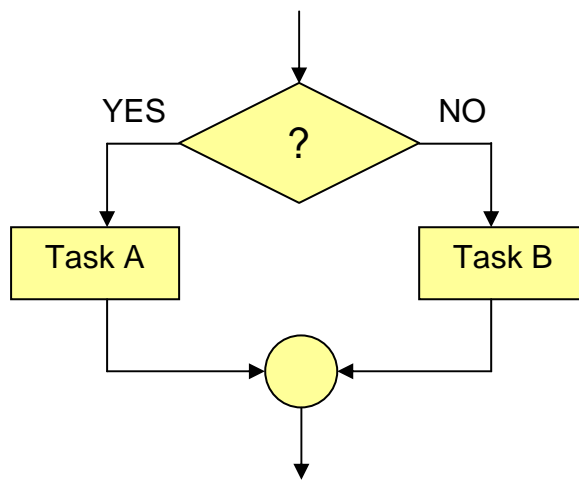
C/ ITERATION (LOOP AND REPEAT):
The program can enter a repetition loop and every time it does the loop a condition is checked and depending on the answer either the execution of the program leaves the loop and so the repetition ends or continues doing the repetition loop.

```
                 ↓
        YES   < ? >   NO
         ↓            ↓
     [ Task A ]    [ Task B ]
         ↓            
```
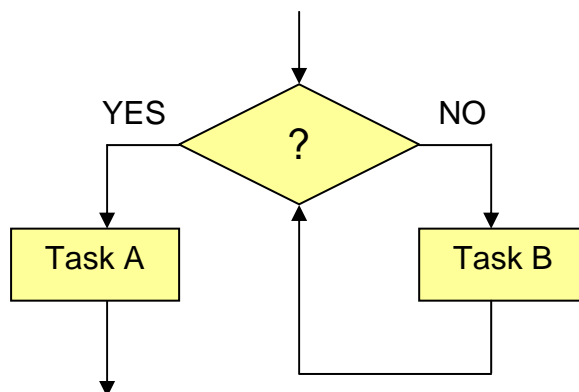
Glossary:

WORDS	MEANINGS
COPYRIGHT	Exclusive rights to reproduce, sell and distribute a work, prepare derivative works and display the work publicly.
SOFTWARE	In general, the programs and instruction sets that run on a computer.
FREEWARE	Software that is free to use (requires no payment), but the author retains the copyright.
SHAREWARE	Software programs that are distributed on a trial basis by independent programmers. These programs are not free, but are inexpensive and the distribution is informal, with payment and registration requested on a voluntary basis.
INSTRUCTION	It is a single operation of a computer processor. It is an element of an executable program, such as a byte code.
PROGRAM	It is a sequence of instructions that a computer can interpret and execute.
ALGORITHM	A set of well-defined rules or procedures for solving a problem in a finite number of steps.
BUG	In computer science, a fault or defect in a system or computer program.
DEBUGGER	A tool for tracing program execution that helps to detect software bugs.
EDITOR	In computer science, it is a program that allows the user to write, modify and store program and text files. There are audio and video editor programs too.
COMPILER	It is a computer program that translates a text file written in a high level computer language (source code) into binary language (object code = machine code).
INTERPRETER	In computer science, it is a program that translates and executes source language instructions one line at a time
SOURCE CODE	Computer program instructions written as a text in a high level language
OBJECT CODE	Computer program written in binary code (machine language) that usually is saved as a **.exe** file
BASIC	Old programming language. (Beginners' All-purpose Symbolic Instruction Code)
HTML	Programming language used in web page design. (Hyper Text Mark-up Language)
PHP	Programming language used in dynamic web page design. (Hypertext Pre-Processor)

@ctivity 2.14

Loop game. Instructions on the teacher's notes.

Exclusive rights to reproduce, sell and distribute a work, prepare derivative works and display the work publicly.
FREEWARE
In general, the programs and instruction sets that run on a computer.
BUG
Software that is free to use (requires no payment), but the author retains the copyright.
EDITOR
Software programs that are distributed on a trial basis by independent programmers. These programs are not free, but are inexpensive and the distribution is informal, with payment and registration requested on a voluntary basis.
COMPILER
It is a single operation of a computer processor. It is an element of an executable program, such as a byte code.
SHAREWARE
It is a sequence of instructions that a computer can interpret and execute.
INSTRUCTION
A set of well-defined rules or procedures for solving a problem in a finite number of steps.
PROGRAM
In computer science, a fault or defect in a system or computer program.
ALGORITHM
In computer science, it is a program that allows the user to write, modify and store program and text files. There are audio and video editor programs too.
SOURCE CODE
It is a computer program that translates a text file written in a high level computer language (source code) into binary language (object code = machine code).
OBJECT CODE
Computer program instructions written as a text in a high level language
SOFTWARE
Computer program written in binary code (machine language) that usually is saved as a **.exe** file
COPYRIGHT

@ctivity 2.15

Copyright questionnaire.

- Individually write in the OPINION column in the table next page
- In pairs, compare your opinions using the language frame provided
- Be ready to answer some questions about one issue from the table

LANGUAGE FRAME

START WITH	AGREEING	DISAGREEING
I think … In my opinion… If you ask me … Another point is …	Yes, I agree with ... OK You're right	I'm afraid I don't agree I completely disagree I don't think so

CODE FOR THE TABLE

P = Previous situations before the action:

- A = You buy / have got a legal CD or DVD
- B = You rent a legal CD or DVD
- C = You borrow a legal CD or DVD from the library

#	P	ACTION	OPINION Is it right ?	LAW Is it against the law ?	FINE / PRISON
1	A/B/C	Copy it for my own use (1 copy only)			
2	A/B/C	Copy it to give it away or lend it to a friend			
3	A/B/C	Copy it to sell to somebody (top blanket street sellers)			
4	A/B/C	Copy it more than once for my personal use			
5	A/B/C	Lend it to a friend so they can listen to or watch it			
6	A/B/C	Convert CD Audio tracks to a different format (MP3, WMA) for my own use			
7	A/B/C	Share your music & video files stored in the computer			
8		Download music & video files from internet			
9		Buy a CD / DVD that could be an ilegal copy			
10	A/B/C	My friend copies that CD / DVD			
11	A/B/C	If I record a CD / DVD with material from different sources that I own			
12		To pay a copyright tax when you buy a blank CD / DVD disc even if you only copy your own work on it.			
13		To pay a copyright tax when you buy a Hard Disc Drive, an MP3 player or a Memory Card			
14	A/B/C	If I edit and modify sound or images from a CD / DVD to test and learn and for my own use			
15	A/B/C	Can I copy it since blank CD / DVD already pay a copyright tax ?			
16	A/B/C	How many people can listen to / watch it at home to be considered a private session ?			
17		The problem is in some actions (copy, lend, share, download, give away, borrow) or is in some uses (private, community, public) or in some commercial issues (sell, rent).			

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FLOW CHART ACTIVITIES

A1/ Draw a flow chart of a program that :
- Asks the user for the radius of a circle (input)
- Calculates the length and the surface of that circle
- Shows the results on the computer screen (output)
- Asks "Do you want to continue?" at the end of the program

The input data must be entered using the keyboard.

A2/ Draw a flow chart of a program that :
- Asks the user to enter two numbers, A and B (input)
- Compares them (A>B, A<B or A=B)
- Shows the results on the screen using text sentences (output)

A3/ Draw a flow chart to describe the process that an automatic washing machine follows.
The process includes prewashing, water warming up to a desired temperature, detergent input, softener input, rinses and centrifuge drainage

A4/ Draw a flow chart of a procedure to calculate the square value of the first 100 whole numbers (integers) and shows the results on the screen.

A5/ Draw a flow chart of a program that :
- Calculates the multiplication table of the number 5
- Shows the results on the screen (output)

A6/ Draw a flow chart of a program that calculates and shows the multiplication table of a number chosen by the user.

A7/ There is a pile of white and black objects. Following a program, we want the arm of a robot to put the white objects in place A and the black ones in place B. When objects are over, the robot must stop. Draw the flow chart of this program.

A8/ In a street, there is a pedestrian crossing with a traffic light control device. Draw a flow chart of the procedure that follows the control device when a pedestrian presses the button to ask for crossing the street.

A9/ Draw a flow chart of the itinerary a 1st ESO student can follow within our present Educational system until he gets a job.

A10/ Draw a flow chart of the process that an automatic teller (working with credit card and/or savings book) follows to consult the balance and to pay into or withdraw money from an account. It must work with a Personal Identification Number (PIN).

A11/ There is a heating system with a thermostat to select the temperature in a room. This thermostat controls the working (switch on/off) of a boiler when the temperature in the room varies half degree below or above the selected temperature. Draw the flow chart of this control system.

A12/ Draw a flow chart to control a three-storey lift.

A13/ We need to control the number of people in some premises for what we install an electronic device that counts the people going in and out. The total amount of people will be shown on a screen (output). Draw the flow chart of this control system.

A14/ Draw a flow chart of a procedure to count the length of a word.

A15/ Draw a flow chart of a program that counts the number of words in a text.

A16/ Draw a flow chart of a stock control in a warehouse for a single item with maximum, minimum and generation of an automatic order.

A17/ There is a labyrinth made with straight and 90 degree curved stretches. Draw a flow chart to command a robot with simple movements (forward, turn 90 degrees, right, left, etc) with the aim of getting the robot out of the labyrinth.

A18/ Draw a flow chart of a program that checks the RAM memory of a computer from 0 to 4GB.

A19/ Draw a flow chart of a program to control the entrance to a car park with an automatic barrier . There must be a button to open the barrier, a presence detector for a car under the barrier, a full/spaces indicator and a ticket teller at the entrance. Once the barrier is open, it must close after 30 seconds if no vehicle is under it.

A20/ Draw a flow chart of the regulation of a double tap system (cold and hot water inputs and mixed water output) with temperature setting made by the user (thermostatic tap).

A21/ Draw a flow chart of a taximeter taking into account the rate of the start of the trip, the price for the distance covered, the price for waiting time, and the possibility of including extras according a schedule rate. If possible, get real information from taxicabs in your town.

A22/ Draw a flow chart for the operation of a petrol pump that can have a maximum pre-established amount in euros.

A23/ Draw a flow chart of an automatic Hotline service.

A24/ Draw a flow chart of the operation of a garage automatic door activated by a remote control and with automatic closing after a given time. To prevent damage, it must include a security system to make the door go up again if it detects a vehicle under it.

A25/ There is a water tank with two level detectors (a maximum at the top and a minimum in the middle). We want to control a water pump to have the tank always with water but avoiding it to overflow or to be completely empty. Draw the tank, the detectors, the pump and the pipes. Also draw the flow chart of the operation of this control system.

A26/ Draw a flow chart of a program to calculate the square root of a number given by the user. The process must give an error message when the given number is negative.

A27/ Draw a flow chart of a program that allows to solve general quadratic equations $(ax^2 + bx + c = 0)$.
- The user has to enter the values for a, b and c (input)
- The program will give the results x_1 and x_2 (output)

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SELF ASSESSMENT UNIT 2

Name:	Date:		
Can do:	**Very well**	**Quite well**	**Needs to be reviewed**
Differentiate types of information, files and applications.			
Classify different types of programming languages.			
Understand and follow flow diagrams and instructions.			
Draw flowcharts for a given process or computer program.			
Differentiate operating systems and application programs			
Explain the process of programming			
Talk about the freeware and shareware movement			
Talk about copyright issues			
Communicate what you have learnt			