Técnicas de Leitura

As técnicas de leitura, como o próprio nome diz, vão nos ajudar a ler um texto. Existem técnicas variadas, mas veremos as mais utilizadas. Ao ler um texto em Inglês, lembre-se de usar as técnicas aprendidas, elas vão ajudá-lo. O uso da gramática vai ajudar também.

As principais técnicas são: a identificação de cognatos, de palavras repetidas e de pistas tipográficas. Ao lermos um texto vamos,ainda, apurar a idéia geral do texto (general comprehension) e utilizar duas outras técnicas bastante úteis: *skimming* e *scanning*.

a) Cognatos

Os cognatos são palavras muito parecidas com as palavras do Português. São as chamadas palavras transparentes. Existem também os falsos cognatos, que são palavras que achamos que é tal coisa, mas não é; os falsos cognatos são em menor número, estes nós veremos adiante.

Como cognatos podemos citar: school (escola), telephone (telefone), car (carro), question (questão, pergunta), activity (atividade), training (treinamento)... Você mesmo poderá criar sua própria lista de cognatos!

b) Palavras repetidas

As palavras repetidas em um texto possuem um valor muito importante. Um autor não repete as palavras em vão. Se elas são repetidas, é porque são importantes dentro de texto. Muitas vezes para não repetir o mesmo termo, o autor utiliza sinônimos das mesmas palavras para não tornar o texto cansativo.

c) Pistas tipográficas

As pistas tipográficas são elementos visuais que nos auxiliam na compreensão do texto. Atenção com datas, números, tabelas, gráficas, figuras... São informações também contidas no texto. Os recursos de escrita também são pistas tipográficas. Por exemplo:

- ... (três pontos) indicam a continuação de uma idéia que não está ali exposta;
- negrito dá destaque a algum termo ou palavra;
- itálico também destaca um termo, menos importante que o negrito;
- '' '' (aspas) salientam a importância de alguma palavra;
- ( ) (parênteses) introduzem uma idéia complementar ao texto.

d) General Comprehension

A idéia geral de um texto é obtida com o emprego das técnicas anteriores. Selecionando-se criteriosamente algumas palavras, termos e expressões no texto, poderemos chegar à idéia geral do texto.

Por exemplo, vamos ler o trecho abaixo e tentar obter a "general comprehension" deste parágrafo:

*"**Distance education** takes place when a teacher and **students** are **separated** by **physical distance**, and **technology** (i.e., **voice**, **video** and **data**), often in concert with **face**-to-**face communication**, is **used** to bridge the **instructional** gap."*

From: Engineering Outreach
College of Engineering – University of Idaho

A partir das palavras cognatas do texto (em negrito) podemos ter um a idéia geral do que se trata; vamos enumerar as palavras conhecidas (pelo menos as que são semelhantes ao Português):

- distance education = educação a distancia
- students = estudantes, alunos
- separeted = separado
- physical distance = distância física
- technology = tecnologia
- voice, video, data = voz, vídeo e dados (atenção: "data" não é data)
- face-to-face communication = comunicação face-a-face
- used = usado (a)
- instructional = instrucional

Então você poderia dizer que o texto trata sobre educação a distância; que esta ocorre quando os alunos estão separados fisicamente do professor; a tecnologia (voz, vídeo, dados) podem ser usados de forma instrucional.

Você poderia ter esta conclusão sobre o texto mesmo sem ter muito conhecimento de Inglês. É claro que à medida que você for aprendendo, a sua percepção sobre o texto também aumentará. Há muitas informações que não são tão óbvias assim.

e) Skimming

"skim" em inglês é deslizar à superfície, desnatar (daí skimmed milk = leite desnatado), passar os olhos por. A técnica de "skimming" nos leva a ler um texto superficialmente. Utilizar esta técnica significa que precisamos ler cada sentença, mas sim passarmos os olhos por sobre o texto, lendo algumas frases aqui e ali, procurando reconhecer certas palavras e expressões que sirvam como 'dicas' na obtenção de informações sobre o texto. Às vezes não é necessário ler o texto em detalhes. Para usar esta técnica, precisamos nos valer dos nossos conhecimentos de Inglês também.

Observe este trecho:

"Using this integrated approach, the educator's task is to carefully select among the technological options. The goal is to build a mix of instructional media, meeting the needs of the learner in a manner that is instructionally effective and economically prudent."

From: Engineering Outreach
College of Engineering – University of Idaho

Selecionando algumas expressões teremos:

- integrated approach = abordagem (approach = abordagem, enfoque) integrada
- educator's task = tarefa (task = tarefa) do educador – **'s** significa posse = do
- tecnological options = opções tecnológicas (tecnological é adjetivo)
- goal = objetivo
- a mix instrucional media = uma mistura de mídia instrucional.

Com a técnica do "skimming" podemos dizer que este trecho afirma que a tarefa do educador é selecionar as opções tecnológicas; o objetivo é ter uma mistura de mídias instrucionais de uma maneira instrucionalmente efetiva e economicamente prudente.

f) Scanning

"Scan" em Inglês quer dizer examinar, sondar, explorar. O que faz um scanner? Uma varredura, não é?! Logo, com a técnica de "scanning" você irá fazer uma varredura do texto, procurando detalhes e idéias objetivas. Aqui é importante que você utilize os conhecimentos de Inglês; por isso, nós vamos ver detalhadamente alguns itens gramaticais no ser " Estudo da Língua Inglesa".

Olhe este trecho:

*" Teaching and learning at a distance is demanding. However, learning will be more meaningful and "deeper" for distant students, if students and **their** instructor share responsibility for developing learning goals: actively interacting with class members; promoting reflection on experience; relating new information to examples that make sense to learners. This is the challenge and the opportunity provided by distance education."*

Poderíamos perguntar qual o referente do pronome " their" em negrito no trecho?

Utilizando a técnica de skimming, seria necessário retornar ao texto e entender a sentença na qual o pronome está sendo empregado. "Their " é um pronome possessivo (e como tal, sempre vem acompanhado de um substantivo) da terceira pessoa do plural (o seu referente é um substantivo no plural). A tradução de "their instructor" seria **seu instrutor** . Seu de quem? Lendo um pouco para trás, vemos que há "students"; logo concluímos que "their" refere-se a "students, ou seja, instrutor dos alunos".

TEXTO 1

Every day more and more of us find that computers have become part of our daily background: magazines we read have been typeset by computers, architects have designed our houses with the help of computers, our paylips are printed by computers, we pay bills prepared by computers, using checks marked with computer symbols, and the payments result in bank statements prepared by computers. Even more directly associated with the machines are those who use them in their day-to-day work – scientists and storekeepers, clerks and directors, soldiers and sailors, accountants and engineers – besides the growing numbers of computer personal who are responsible for making the machines do the work. Each of us, whether layman, computer use or computer technician, will have problems with computer terminology.

TEXTO 2

In the beginning, there was the analog cell phone. And then the cell phone went digital. And that provides a clearer connection and more reability. Now the future of technology appears to be in the hands of the mobile phone industry. Cell phones and handhelds are everywhere. The future is now, and it is wireless. Except the future is still the future. Wireless technology is relatively young. The first generation has been around only since the early 1980s, when analog voice transmission networks were introduced. The second generation took over in the mid-'90s with the advent of digital wireless voice and data networks, giving us the capabilities that spawned the cell phone revolution we know today.

Now comes the so-called third generation – or 3G – which generally refers to networks capable of connecting to the Internet at speeds 40 tines the rate of today's cell phones, promising Interneting connections will be fast enough to download streaming audio and files, swap digital photos, and hold teleconferences. It will also use the existing spectrum space more efficiently and increase the speeds with which basic data can be transmitted over wireless devices.

TEXTO 3

Lamps can be connected in series or in parallel. If you connect lamps in parallel the lamps stay the same brightness however many lamps you add. This is because the voltage across every lamp is the same. In your house the lamps are connected in parallel. This means that even if you have all the lights on, the lights do not dim.

Digital Oscilloscope

For the maximum safety of the person who may use the oscilloscopes, they have been designed and manufactured for full safety features and they are shipped after stringent inspections. And yet, it is unavoidable handle it carefully, in order to avoid damage to the instruments and hazards to the persons.

Above, there are notes and warnings which the persons using the instrument must take heed of and observe:

NOTE – Calls for special attention for correct and efficient use of the instrument.

WARNINGS – Calls for attention for a matter which might lead to a damage of the oscilloscope itself or other instruments.

The following symbols may be posted on the oscilloscope as well as indicated in this manual.

"DANGER! HIGH VOLTAGE" – This symbol means that the item cannot be charged up to a hazardous high voltage and must not be touched with bare hands.

"REFER TO THE CORRESPONDING SECTION" – This symbol means that relative explanations contained in other parts of the handbook should be consulted.

CAUTION – Means a matter which can lead to electric shock hazards to the person who is operating the instrument or to damage of the instrument itself or other instruments.

USE A 3-PIN PLUG - For the input of AC input cable, be sure to use a 3-pin type (one of the pins is used for safety grounding).

AC LINE VOLTAGE – Be sure to operate the oscilloscope on an AC line voltage within is correct range.

AC POWER CABLE – When replacing the AC plug of the AC power cable, be sure to replace it with a plug of the correct type and ratings, and to connector the GND, NEUTRAL and LIVE wires which are color colored as shown in figure below:

Fig 1

AC POWER FUSE – Be sure to use a power fuse of the correct ratings.

COVERS – This oscilloscope has hazardous high voltages internally. Do not remove the covers of the oscilloscope lest you should expose yourself to such high voltages. The covers should be removed only by qualified experts.

FEATURES

(1)   **Easy to operate –** You can easily use major functions of the oscilloscope which employs a direct knob control system.

(2)   **Compact and light –** COR 5500U series is very compact and light for its sophisticated functions and reliable performance. This has become feasible through dexterous use of flush-mount components.

(3)   **CRT readout –** It displays various items of information on the CRT screen, providing you with powerful means for rapid but accurate measurements.

(4)   **Comment display –** You can display comments by using this feature.

(5)   **Alternate magnified sweeps –** This feature allows you to magnify readily any portion of the waveform you want to observe more closely. This time base can be magnified by 5,10 or 50 times. The Alternate Magnified Sweep mode, which runs a mains sweep and magnified sweep alternately, is also available.

(6)   **Sampling rate up to 20 MS/s –** Each channel has a 5 bit A/D converter, allowing you to store the single-shot data from both channels simultaneously. In single Trigger Mode, you can capture frequency components up to 5.7 MHz (when Curve Interpolation is used).

(7)   **4k words/ channel memory capacity –** each channel has a 4k word memory, and resolutions of 400 points per one division horizontally. The stored and reproduced waveforms closely resemble the original analog ones. COR 5500U series has two 4k-word Saving Memory units. The memory units are internally backed up so that the data is not destroyed even if the power is turned off. The data is maintained for a longer period.

(8)   **Repetitive mode –** The COR 5500U can store repetitive signals up to 100 MHz.

PRECAUTIONS

(1)   <u>Receiving Inspections</u> – The oscilloscope has been subjected to electrical and mechanical tests to guarantee the satisfactory quality and performance.

(2)   <u>General precautions</u> - This section is about electrical and mechanical precautions for safe and correct use of the oscilloscope. Read this section before start using it:

- *Checking the AC line voltage and frequency*
Operate the oscilloscope on as rated AC input voltage of 100 through 240 V, frequency 50 through 400 Hz, although it is permissible to operate the oscilloscope on an AC line voltage of 90 -250 V, frequency 45-440 Hz.

- *Checking the type and ratings of fuse*
Before connecting the power cable to the AC inlet of the oscilloscope, check the type and rating of the power fuse. The fuse holder of the oscilloscope is structured integrally with the AC inlet. The fuse holder cap can be detached by using a screwdriver or a pointed tool as showing bellow. Two fuses (one of which is for replacement spare) are put in the cap.

Fig 2

Take out the fuse and check that is a slow-blow fuse of 250 V AC, 2 A. Return the fuse and cap to the original positions by following the take out procedure in the reverse order. Fully insert the cap until it clicks.

When you replace the fuse with a new one, make sure to use a correct one. The spare fuse is put in the fuse hold cap. When the fuse has also used up, you may use a new one available on the market, but be sure that it is the correct type and rating.

Warnings: Never use a wrong or incorrect fuse. Never short-circuit the fuse holder terminals instead of the fuse. These operations might result in serious damage and hazards.

(3) <u>**Checking the power cable**</u> - Be sure that the power cable is supplied as an accessory of the oscilloscope. The power cable has a 3-color wire and a 3-pin receptacle; one of the three pins being for safety grounding.

(4) <u>**Environments**</u>

Avoid using oscilloscope in environments as mentioned below:

a) **High temperature** – Do not expose the
 oscilloscope to direct sunlight or other source
of heat. The ambient temperature range for the
 guaranteed performance is 10 to 40ºC or 50
to 104ºF.

b) **High humidity** – Do not use the oscilloscope
 in high humidity. The humidity range for guaranteed
performance is up to 75% RH.

c) **Electronic magnetic field** - Do not use the
oscilloscope in strong electric or magnetic field,
 lest the displayed images should be distorted,
or otherwise adversely affected.

d) **Unstable position** - Do not use the oscilloscope
on a swaying bench or other unstable positon.

e) **Flammable atmosphere** - Do not use the
oscilloscope in flammable or explosive atmosphere,
 to prevent fire and explosion hazards.

f) **Blocked ventilations holes** – Do not block
the rear, side and button panels. Provide an

ample space behind the rear panel, where the

air-cooling fan is installed on.

(5)   Preserving the CRT

CRT intensity - In order prevent permanent damage

 to the CRT phosphor, do not make the CRT trace

Excessively bright or leave the beam spot stationary

 for an unreasonably long time

(6)   Checking the Oscilloscope operation

Check the operation of the oscilloscope as explained in this section. The oscilloscope will automatically diagnose itself as you turn the power switch on.

    a) Confirm if the power switch is off;

    b) Connect the power cable to the AC inlet of the oscilloscope;

    c) Connect the power plug to an AC outlet.

    d) Turn the power switch on;

    e) The green indicator LED on the power switch will light up;

    f) The readouts and traces will appear on the CRT screen;

    g) After a minute, turn the power switch off once;

    h) Wait for several seconds and turn the power on again;

    i) Your will see the screen for about 2 seconds if the diagnostic results are passed.

If a diagnostic result is failed turn the power switch on and off a few times, this fact means that the oscilloscope has a trouble: the ROM or RAM of the oscilloscope might be failed.

(7)   Preparation for measurement

This section covers a simple preparative procedure to do first before using the oscilloscope in order to measure waveforms or signals more efficiently and accurately. For the preparative procedure, proceed as follows:

CAUTION – Be sure to read " Precautions" and the following:

1) Checking the AC line voltage and frequency;

2) Checking the type and ratings of the fuse;

3) Checking the oscilloscope operation.

LOGIG LAB UNIT (MINILAB)

1. Features of ED- 1000-B LOGIC LAB UNIT (LLU)

LLU is devised to design and test the circuits consisted of various kinds of digital and linear IC's as well as transistors.

There are two characteristics in this product. First, it has several buil-in circuits, which are very useful for the experiment of digital circuits. Second, all the connectors, switches, lampas and knobs are located in order to provide easy connections and experiences with the components.

Power is supplied from either 100V or 220V. This product has DC power supply.

2. Descriptions of panel controls and connectors

(1) HEXADECIMAL NUMBER DISPLAY (DIGIT DISPLAY): displays hexadecimal numbers 0-9 and A-F bit binary input.

(2) LED INDICATOR: there are four LEDs both sides, right and left, which makes eight in total. Monitors inputs or outputs of BCD.

(3) VOLTAGE METER: measures voltage ranging from 0 to 15V. The input resistance is 100 KΩ.

(4) VARIABLE RESISTOR   10 K Ω   and
(14) VARIABLE RESISTOR   500 KΩ

(5) PULSE OUTPUT (1 Hz, 10 Hz, 100 Hz): provides continuous square waves at each terminal.

(6) BREAD BOARD (PROTO BOARD): used for connections between several parts of a circuit.

(7) PUSH BUTTON LOGIC SWITCH: provides inputs for logic control.

(8) DATA SWITCH: every five switches furnishes Low/ High logical levels. They enable you to experiment digital circuits with different control signals and data input.

(9) PUSH BUTTON SWITCH: if inserted serially to a circuit, you can have ON-OFF operation.

(10)   POWER SWITCH: turns ON and OFF AC 100V or 220 V input.

(11)   DC OVERLOAD ALARM: gives a warning sign in case of overloading troubles.

(12)   60 Hz OUTPUT: outputs AC 4.5 V(RMS) with 60Hz. This signal can be applied to clock signal or time base.

(13)   BUZZER INPUT: operates on 2-5V. The input current is less than 1 mA (as small as CMOS output).

(15) DC OUTPUT: provides + 5V/ - 5V DC power, with is used for digital circuits.

(16) CURRENT METER: measures load current of 5V out put. It is connected serially with output.

(17) COMMON MODE SWITCH (CM SELECTOR): selects input polarity to LED indicator. If put to "ANODE", LED will be ON with input "0". Contrarily, if put to "CATHODE", LED will be ON with input "1".

3. Logic Lab Unit operating procedures

➢ WARNINGS

- Make sure that AC input voltage is 110V or 220 V and select corresponding voltage input selector at rear panel;

- Keep this unit away from heat and dusty place;

- When you connect the circuit on bread board, use jump wire whose diameter is less than 6 mm;

- Make sure that pin 1 (index notch) identification of all IC is correctly directed as you designed;

- Check if Vcc/Vdd of every IC is connected to proper power supply.

➢ PROCEDURES

1. Turn the power switch OFF;

2. Connect +5V DC and GND with bus strip on bread board. Be aware that pin 14 or 16 of IC is Vcc/ Vdd and pin 7 or 8 is GND usually;

3. Place all the ICs and other parts so that connections between them may be done easily. While doing this, take into consideration about LED indicators and logic switch too;

4. Connect them using jump wire. It is recommended to use wires with different colors according to their usage for future checking. Example:

        +5V……..red   Output…………white   Others……green

        Input …… yellow   GND…………..black

5. Check the circuit connections again. If everyone is correct, turn the power switch ON. Keep and eye on current meter. If excess current is indicated, turn the power switch OFF immediately and find out if there is any shorted circuit between +5V and GND;

6. After everything is proved right, do your experiment using those switches and indicators properly.

MINILAB TECHNICAL TERMS

BUZZER INPUT -   entrada de sonorizador, buzina
BREAD BOARD-   placa de alimentação
BUS STRIP-   barramento, barra ônibus
CLOCK SIGNAL -   sinal de relógio
COMMON MODE SWITCH-   comutador de modo comum
CONTROL PANEL -   painel de controle
CURRENT METER-   amperímetro ou medidor de corrente
FRONT/ REAR BOARD-   placa frontal/ posterior
FRONT/ REAL PANEL-   painel frontal/ posterior
HEXADECIMAL DISPLAY-   mostrador em hexadecimal
HIGH LEVEL-   nível alto/ elevado ("1")
INDEX NOTCH-   entalhe marcador
JUMP WIRE-   fio "jumper", ponte, ligação direta
LED INDICATOR-   indicador luminoso
LOGICAL LEVEL-   nível lógico
LOW LEVEL-   nível baixo ("0")
NUMBER DISPLAY-   mostrador de números
PANEL CONTROLS-   controles do painel
POWER SUPPLY-   suprimento de energia elétrica, fonte de alimentação
POWER SWITCH -   chave, interruptor, alavanca ou tecla para alimentação
PROTO BOARD -   placa para montagem de protótipos
PUSH BUTTOM SWITCH -   tecla de pressão comutadora
SHORTED CIRCUIT-   curto circuitado, "em curto"
SWITCH OFF -   desligado, desarmado
SWITCH ON -   ligado, armado
TIME BASE -   base de tempo
VOLTAGE METER -   voltímetro
WIRE COLOR -   cor de fio ou condutor

ABREVIATIONS/ MONOGRAMS

AC   (LTERNATE CURRENT) -   Corrente alternada
BCD   (BINARY CODED DECIMAL) -   decimal codificado em binário
CMOS (COMPLEMENTARY METAL OXIDE SEMICONDUCTOR) -   semicondutor metálico
DC   (DIRECT CURRENT) -   corrente contínua
GND   (GROUND) -   aterramento, terra

IC   (INTEGRATED CIRCUIT) -   circuito integrado
LED   (LIGHT EMITTING DIODE) -   diodo emissor de luz
RMS (ROOT MENA SQUARE) -   valor médio quadrático ou eficaz
SW   (SWITCH) -   chave, interruptor, interruptor, alavanca
VR   (VARIABLE RESISTOR) -   resistor variável

MINILAB RESEARCH

According	Emit	Output	Useful	According
All	Enable	Own	Useless	All
Alternate	Experiment	Panel	Very	Alternate
Alternative	Feature	Pin	View	Alternative
Anode	Find	Procedure	Voltage	Anode
Any	First	Proper	Wave	Any
Apply	Five	Provide	Warning	Apply
As small as	Following	Push	Which	As small as
As well as	Front	Pulse	White	As well as
At your own	Furnish	Put	Whose	At your own
Away	Ground	Range	Wide	Away
Be off	Heith	Rear	Width	Be off
Be on	High	Red	Wire	Be on
Because	In order to	Right	yellow	Because
Between	Índex	Same	Consist	Between
Black	Input	Second	Current	Black
Board	Integrated	Serially	Design	Board
Bread board	Jump wire	Several	Devise	Bread board
Buzzer	Keep an eye	Shord	Diode	Buzzer
Cathode	Knob	Shorted	Direct	Cathode

Multitester – Instruction Manual

Appearence and parts names

1. Indicator zero corrector
2. 2. Range selector switch knob
3. Measuring terminal +
4. Measuring terminal – COM (common)
5. OUTPUT (series condenser) terminal
6. 0 Ω adjusting knob
7. Panel
8. Indicator pointer
9. Rear case bolt
10. Rear case
11. Connector for hFE test
12. Connection pin to tester
13. Transistor base clip
14. Transistor collector clip

SPECIFICATION
DC VOLTAGE
Ranges:
0.1 – 0.5 – 2.5 – 10 – 50- 250 – 1000V

Accuracy at FSD	:4%
Sensitivity	:20 K Ω / V

AC VOLTAGE:
Ranges:
10-50-250-1000V

Accurancy at FSD	:5%
Sensitivity	:9 K Ω / V
Decibelmeter	: - 10 to + 50dB
	0 db = 1mw/ 600

DC CURRENCY
Ranges:
50 µ A (at 0. 1VDC position), 2.5 – 25mA,   025A 10 A
Accuracy at FSD: ± 3%
Volt Drop   : 250 mV

Weith 280g
Operation

Ω TEST
(1) Plug the test lead into COM and + sockets;
(2) Place the range selector to a prescribed range position;
(3) Short the test leads and turn 0Ω ADJ to set the pointer to zero position;
(4) Make sure that there is no voltage across the circuit to be tested;
(5) Connect the test leads to the tested resistor and read the scale in accordance with the reference table.

DCV TEST
(1) Plug the red test lead into the + socket and the black one into the –COM;
(2) Set the range selector to a selected DCV range position;
(3) Connect the red test read to the positive polarity of the circuit tested and the black one to the negative;
(4) Read the DCV A scale referring the reference table.

ACV TEST
(1) Plug into the red tet leads into the + socket and the black into the – COM socket;
(2) Set the range selector to a chosen ACV range position;
(3) Connect the test leads to the circuit being tested regardeless of the polarities;
(4) Read ACV scale with the reference table.

DCA TEST
  ➢ Place the red test lead into the + socket and the black into the –COM;
  ➢ Set the range selector at the selected DCA range position;

➢ Connect the red test lead to the positive polarity of the circuit tested and the balck into the negative;

➢ Read the DCV A scale converted with the reference table.

ACV TEST ON OUTPUT TERMINAL

➢ Plug the red tet lead into the OUTPUT socket and the black one into the – COM;

➢ Set the range selector at the selected range position;

➢ Connect the test leads to the circuit to be tested and read the scale in the same manner as ACV test. Such a measurement is made to block the DC voltage which presents in the same circuit and must be4 cut out so that AC Voltage can be read alone.

TRANSISTOR TEST

1. Iceo (leakage current) test.

   1) Plug the test leads into + and –COM sockets;
   2) Set the range selector to X10(15mA) for small size transistor, or to X 1(150mA) for small size transistor;
   3) Adjust 0Ω ADJ to set the pointer to zero position of the Ω scale;
   4) Connect the transistor with the tester:
      - For NPN transistor, the "N" COLLECTOR (C) of the transistor and the "P" terminal with the EMITTER (e) of the transistor;
      - For PNP transistor, reverse the NPN transistor connection.

      5) Read the Iceo range, if the pointer is within the LEAK zone or the pointer moves up the full scale, the transistor tested is not good, otherwise it is a good transistor.

hFE (DC amplification) test

(1) Set the range selector at selected range position – X 1K for 0 -150 for 15 mA, X1 for 0 – 150 mA test;

(2) Adjust 0Ω ADJ to adjust the pointer to zero position;

(3) Connect the diode to the tester:
   - For IF (forward current) test:
      A- Connect the "P" terminal of the tester to the emitter of the transistor with the hFE test lead;
      B- Plug the hFE connector into "N" terminal and connect its red clip to the collector and the black one to the base of the transistor;
   - For PNP transistor:

      A- connect the "N" terminal of the tester to the emitter of the transistor;
      B- Plug the hFE connector into the "P" terminal and connect the clips in the same way as for NPN transistor connection;

(4) Read the hFE scale. The value of the reading is Ic/ Ib, which is the DC amplification degree of the transistor tested.

DIODE TEST
   (1) Set the range selector at selected range position – X1K for 0 – 150 μ A, for 15mA, X1 for 0 – 150 mA test;
   (2) Connect the diode to the tester:
      - For IF (forward current) test connect the "N" terminal of the tester to the positive polarity of the diode and the "P" terminal to the negative polarity of the diode. For IR (reverse current) test, reverse the connection;
   (3) Read IF or IR one the LI scale provided;
   (4) Read the linear (forward) voltage of the diode on the LV scale while testing IF or IR.

Electronic Circuits

Introduction
   This unit introduces you to electronic circuits and explains the meaning of current, voltage and resistance. You will find out about Ohm's equations and about some of the components used in building electronic circuits.

Shining a light
   Have you ever taken an torch to pieces to find out how does it work? Look at Fig. 1 below, which shows the arrangement of parts inside a torch.
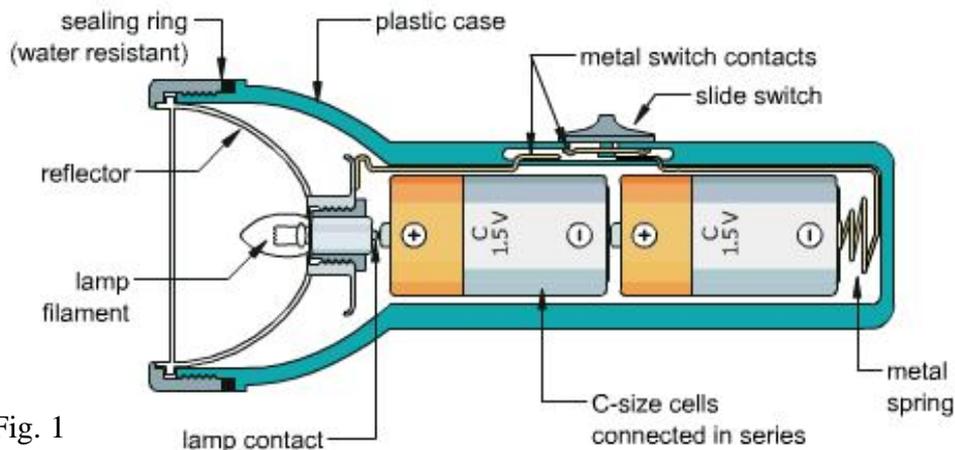

Fig. 1

   Why did the designer of the torch choose this particular combination of materials?

- The metal parts must **conduct** electric current if the torch is to function, but they must also be able to stand up to physical forces.
- The spring holding the cells in place should stay springy, while the parts of the switch must make good electrical contact and be undamaged by repeated use.

Which materials used in making a torch are conductors and which are insulators?
(   ) plastic
(   ) copper
(   ) tungsten (lamp filament)
(   ) glass (outside of lamp)

Drawing a circuit diagram

A different way of describing the torch is by using a circuit diagram in which the parts of the torch are represented by symbols.
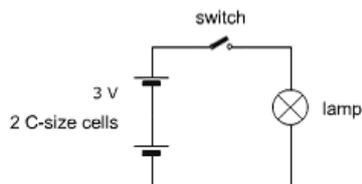

Fig. 2

In Fig. 2 there are two electric cells ("batteries"), a switch and a lamp (the torch bulb). The lines in the diagram represent the metal conductors which connect the system together.

A circuit is a closed conducting path. In the torch, closing the switch completes the circuit and allows current to flow. Torches sometimes fail when the metal parts of the switch do not make proper contact, or when the lamp filament is "blown". In either case, the circuit is incomplete.

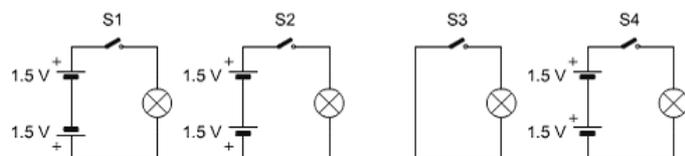The diagrams show different arrangements of cells, switches and lamps.

Fig. 3

Current

An electric current is a flow of charged particles. Current is sometimes carried by positively charged particles, but inside a copper wire, current is carried by small negarively charged particles, called electrons. Metals, such as copper, contain free electrons, which drift in rang]don directions as shown in Fig. 4.

Fig. 4

Voltage

Each cell provide a push, called its **potencial difference** or **voltage.** This is represented by the symbol V, and is measured in volts, V. Sometimes, you will want to measure voltages in thousands of a volt, or milivolts, mV.

Typically, each cell provides 1.5 V. If cells are joined together one after the other, they are said to be connected **in series**. Two 1.5 V cells connected in series provide 3V, while three cells provide 4.5 V.
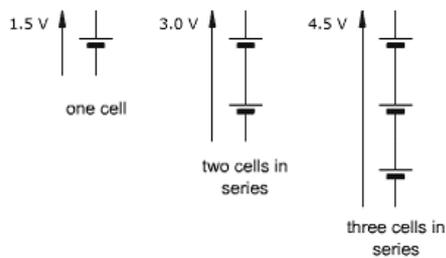
Fig. 5

Resistance

If a thick copper wire is connected from the positive terminal of a battery directly to the negative terminal, you get a very large current for a very short time. In a torch, this does not happen. Part of the torch circuit limits, or *resists,* the flow of current. Most of the circuit consists of thick metal conductors which allow current to flow easily. These parts, including the spring, switch plates and lamp connections, have a low **resistance**.

The flow of current through the filament causes it to heat up and glow white hot. Lamp filaments are usually made of the metal tungsten because of its very high melting point. In hair, the filament would quickly oxidize. This is prevented by removing all the air inside the glass of the lamp and replacing it with a non-reactive gas.
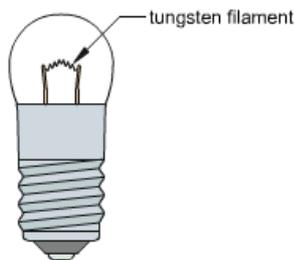
Ohm's equations

The relationship between current, voltage, and resistance was discovered by Georg Ohm, who published his results in 1827.

Ohm made his won wires and was able to show that the size of an electric current depend upon their length and thickness. The current was reduced by increasing the length of the wire or by making it thinner. Current was increased if a shorter thicker wire was used. In addition, larger currents were observed when the voltage across the wire was increased.

From experiments like these, Ohm found that, at constant temperature, the ratio of voltage to current was constant for any particular wire, that is:

$$R = \frac{V}{I}$$

Where, R = resistance, V = voltage and I = current.

Ohm's Law states that, at constant temperature, the electric current flowing in a conducting material is directly proportional to the applied voltage, and inversely proportional to the resistance.

Rearranging the formula gives two additional equations:

$$V = IR$$ and $$I = \frac{V}{R}$$

These simple equations are fundamental to electronics and, once you have learned to use them effectively, you will find that they are the key to a wide range of circuit problems. You are going to need these equations, so learn them now.

Did you know…? Light bulbs

The lamp filament was first invented in 1860 by a British physicist, Sir Joseph Swan. When electric current passes through a thin filament of conducting material, the filament heats up and, if the current is large enough, the filament becomes first red hot and then white hot, or **incandescent**. In air, this effect is short-lived because the filament burns up and breaks. Swan had the idea of enclosing the filament in a glass container, preventing oxidation by removing the air inside the container using a vacuum pump.

These early experiments suggested that a useful light source was possible, but Swan did not have as sufficiently powerful vacuum pump. Years later, Swan tried again using a better vacuum pump. In 1878, he has successful in demonstrating a true incandescent light bulb.

The American Thomas Edison demonstrated a similar lamp in 1879. However, his real contribution was to develop not just the light bulb but the whole concept of electric power into a practical, safe and e economic system. In September 1882, the first commercial power station went into operation, providing light and power to customers in part of Manhattan. The electric age had begun.

Edison tested thousands of different filament materials. The first commercial lamps had filaments made of carbon. This was later replaced by **tungsten**, a metal with a particularity high melting point.

In modern filament lamp, a very fine tungsten wire is coiled in a tiny spiral. This spiral is coiled again to make a "coiled coil". This arrangement concentrates the heat produced as current passes through the wire, causing the filament to heat up and reach incandescence much more quickly. The space inside the lamp is filled with a non-reactive gas, usually an argon/ nitrogen mixture.

The outline of most parts of the world is identified clearly by city lights. Only recently have people stared to worry about all the energy used in lighting and how it affects global warming. The filament lamp is not very efficient and converts just 10 per cent of its energy into light. The rest is wasted as heat. Energy efficient light bulbs use a different technology and use three to four times less energy for the same light output. Every home should have them!

The race is on for lighting manufacturers to find ways of making lighting more energy efficient. Huge savings could be made. It´s possible that in a few years you will be albe to light your house using super-efficient giant LEDs (light-emitting diodes).

Parallel lamps

Lamps can be connected in series or in parallel. If you connect the lamps stay the same brightness however many lamps you add. This is because the voltage across every lamp is the same. In your house the lamps are connected in parallel; this means that even if you have all the lights on, the lights do not dim.

Batteries

Batteries are a source of electrical energy. The energy is stored as chemical energy and is converted into electrical energy as it is required. The more energy a battery stores the longer it will last.

Different types of batteries have different voltages. The voltage is a measure of the strength of the battery. The higher the voltage, the brighter the bulb and the faster the motor. As a battery runs out its voltage gradually drops.

Many batteries have a voltage of 1.5 V. for most lamps this is not enough, so often two batteries are connected in series. This doubles the voltage to 3 V.

Fuses

Electricity can be dangerous if you short a battery or the supply in your house a very high current flows. Sometimes the wires which carry the current heat up and melt. This may cause a fire or an explosion.

Fuses protect against fire caused by electrical faults. When the current gets too high, fuses burn out and break the circuit. This stops the wires from burning. After a fuse burns out, a qualified person must find the fault before the fuse is replaced.

Electric Circuits

Electricity is a very useful type of energy. The beauty of electricity is that it can be generated in one place and used in another place. For example, the lamps in your house could be lit by electricity generated by solar panels on the top of a hill.

Electric current can flow along move around circuits (loops) like the chain moves on a bicycle. This is why batteries have two terminals. Current flows out of the positive terminal and into the negative terminal. If there is a break in the circuit then current cannot flow.

Inductor

An inductor stores energy in an electromagnetic field created by changes in current through it.

Its ability to oppose a change in current flow is called inductance, L, and is measured in henrys. An inductor can have any value form μH to H.

Electric motors

Electrical energy can be converted into mechanical energy using an electric motor. Electric motors are used in many products. One of the most important uses of the elecrric motor is in electric cars.

Flashlights

You can make a flashlight by connecting a lamp across a battery. This would not be a good flashlight because the lamp would always be on. To turn on and off you need to add a switch. Simple switches have two terminals together. This allows current to flow around the circuit.

Dimming lights

Switches are useful if you want to turn a circuit on or off. But sometimes you also want to vary how much current flow around a circuit. For example, some lamps have a knob to control their brightness.

Putting a resistor in a circuit reduces the current. The higher of the resistor the more the current is reduced. So a resistor can be used to dim lights.

Capacitor

A capacitor stores electrical energy in the form of electrostatic field. Capacitors are widely used to filter or remove AC signals form a variety of circuits. In a DC circuit, they can be used to block the flow of direct current while allowing AC signals to pass.

A capacitor's capacity to sore energy is called is capacitance, C, which is measured in farads. It can have any value form pF to mF.

Linear Resistors

Resistors are the most numerous components en electronics. Because of their frequent use, they determine the rehabilitee of the whole system in many ways. The ideal resistor has a purely real conductance. When a voltage is applied, the electrical energy is converted into thermal energy. Since many of the resistor´s electrical characteristics are dependent on the temperature, the behavior of the resistance-temperature curve is significant for determining the range of possible applications.

We speak of linear resistors or ohmic resistors, when their voltage/ current behavior is linear and obeys Ohm´s Law $R = V/I$ (where R= resistance, V= voltage, I= current). As a rule the resistance is temperature dependent: $R_T = T_{T0} \cdot (1 + \acute{\alpha} \cdot \Delta T)$. ΔT is the temperature variation and $\acute{\alpha}$ is the temperature coefficient.

1. INTRODUCTION

<u>General</u>

The region under consideration is Northeast Brazil between 1º and 18º south latitude and between 35º and 47º west longitude. This covers an area of almost 1.6 million km^2 (see fig. 1). This region exhibits a pronounced time and space variability in the rainfall distribution, with a drastic dry inland region where the annual normal rainfall is below 500 millimeters (~ 20 inches). Serious social and economic problems result from the regional population requirements of over 20 million people and their dependence upon agriculture. It is noteworthy that the region is located in a latitudinal band where a regular distribution of rainfall should be expected. This region was first settled in the early 16th century. It is felt that in previous centuries the rainfall was somewhat greater than it is now. Some natural or man induced climate changes may have taken place. It is difficult to forecast the wheather in this area due to the lack of detailed knowledge of the tropospheric wind structure and its influence on meteorological phenomena. Careful investigation of the relationship between wind, temperature, moisture and weather distribution, as well as the orographic influences, would provide a better understanding of the rainfall amounts and their variability. This should increase the reliability of weather forecasts required to carry out the many meteorologically sensitive human activities in this region. This is the purpose of this study.

TESTS ON INDEPENDENT DATA

Standard statistical tests of significance are not strictly applicable to meteorological prediction because the data are usually correlated in both space and time, and the weather regime of one period may be entirely different from that of another. These difficulties were compounded in the present study because the predictors were not chosen at random, and the regression equations were derived from observed heights but applied to numerical prognostic heights. Hence no tests of significance giving exact confidence intervals or probability levels were applied. Instead all prediction equations were tested on independent data samples. Unfortunately, however, these samples were rather limited in size because of paucity of data, particularly in the form of numerical prognoses, so that the results of the prediction experiments to be described here may not be duplicated on future samples. These results should therefore be interpreted only as tentative and approximate indications, not as conclusive or quantitative findings.

Assembly Languages

Assembly language is a programming language that talks fairly directly to the computer. Unlike machine language, which is what the computer understands, assembly language is mnemonic, so that it can be understood and remembered more easily by a human being; in fact, assembly language is really just machine language in mnemonic form.

Assembly languages are specific to a given CPU chip and are named after it (e.g., 8080 assembly language, 6809 assembly language etc.). They are harder to program than a high-level language, but they produce programs that are more efficient and run faster.

VOCABULARY
Fairly = quase
Unlike = ao contrário de, diferente de
Just = apenas, justamente
CPU = Central Processing Unit = Unidade Central de Processamento
Are named = recebem o nome
After it = de acordo com ele (chip)
Harder = mais trabalhosas
Run faster = rodam mais rápido

Inputting / Outputting Information

Magnetic tape – it is one of the principal input/output recording media used with computers and is mainly used for storing intermediate results of computations and for compact storing of large amounts of data, in an ordered sequence. It is much cheaper to store information on tape than in the computer main memory or on a disk memory device, but it takes longer to locate a paritucular data item if it is stored on tape: data must be stored and accessed sequentially.

Magnetic disk – it consists of a series of concentric paths or tracks each capable of storing data in magnetically coded form. It looks like a phonograph record and a series of disks is mounted on a vertical shaft. One or more access arms move into the disk to read or write the data stored on it. Disks may be hard (made out of aluminum) or floppy (made out of plastic). Disks may be permanently attached to the drive unit or they may be made up as removable disk packs. Disks may be made even more efficient by using laser beam to read and write data.

VOCABULARY
Media = pl. of medium (Latin word) = meios
Large amounts = great quantities = grandes quantidades
Cheaper = more inexpensive = mais barato
It takes longer = leva mais tempo
Accessed = reached = alcançados, acessados
Paths or tracks = trilhas
It looks like = parece com, é semelhante a
Shaft = eixo
Drive unit = dispositivo impulsor
Packs = packages = vários discos presos por um eixo
Laser beam = raio laser

Mainframes, Minicomputers and Microcomputers

A mainframe computer is a large computer system comprised of a large central processing unit, separate memory banks, multiple data-storage devices and peripherals. It is found in computer installations which process immense amounts of data. This powerful machine has a larger repertoire of more complex instructions which can be executed more quickly.

A minicomputer is much smaller than the mainframe computer. It was developed to perform limited functions in scientific environments with less computing capacity. It became possible to reduce the size of the computer with the replacement of vacuum tubes by transistors and the development of multicircuit "chips".

A microcomputer is the smallest of the three sizes of computers. The central processor of a micro, called the microprocessor, is built as a single semiconductor device, that is, all the elements necessary to perform all the logical and arithmetic functions are manufactured as a single chip. The microprocessor literally contains a computer on a chip that can pass through the eye of a needle.

VOCABULARY

Comprised of = including = incluindo, compreendendo, composto de
Multiple = tendo muitas partes; múltiplo
Repertoire = repertório, conjunto
Enveironments = surroundings = ambientes

The Concept of a Database

In general we might say that all the files that make up the data processing system of a company form their database.

However, the term database is now used in a much broader and more comprehensive sense. To appreciate this let us contrast a conventional data processing system and a database system.

A conventional data processing system consists of one or more separate files for each application; in a database system a single large collection of data serves all applications.

If we were to survey the software market today, we would find a large number of database systems available.

VOCABULARY
Database = databank = banco de dados
Files = arquivos
Make up = formam
Broader = larger, wider = mais amplo
Sense = sentido, significado
To survey = to examine = examiner, pesquisar
Software market = Mercado de software, isto é, de programas

What Happens Inside a Computer?

When we sit down at a computer, we type on a keyboard which is one of the means of inputting data. And when we type on this keyboard, each letter or number is converted into a series of 0s and 1s. This binary language is what the computer understands.

After being converted into 0s and 1s, the data are then changed into electrical impulses which travel over a cable to the computer, where they are stored in **memory**. Each computer word, called a **byte**, is assigned a place in a memory cell to await processing. The data, now in the memory cells, are acted upon and processed according to the **program** being used.

The **output**, or final result, is then achieved and converted back into numbers and letters, which is displayed on **TV screen** or printed on paper by a **printer**.

VOCABULARY

Keyboard = teclado
Binary language = linguagem que o computador entende, composta de zeros e uns; linguagem binária.
Travel = passam de um ponto para outro
Byte = oito dígitos binários; oito "bis"
Assigned = given = indicado, especificado
Achieved = accomplished = alcançado
Printer = máquina que imprime; impressora

Artificial Intelligence

Artificial intelligence is the branch of computer science that deals with using computers to simulate human thinking. It s concerned with building computer programs that can solve problems creatively, rather than simply working through the steps of a solution designed by the programmer.

One of the main problems of artificial intelligence (AI) is how to represent knowledge in the computer in a form such that it can be used rather than merely reproduced. A computer that tells you the call number of a library book is not displaying artificial intelligence; it is merely echoing back what was put into it. Artificial intelligence would come into play if the computer used its knowledge base to make generalizations about the library's holdings or construct bibliographies on selected subjects.

VOCABULARY
Deals with = trata de…
Rather than = em vez de
Echoing back = devolvendo
Would come into play = entraria em ação
Library's holdings = arquivos da biblioteca

Binary Numbers

Binary numbers are well suited for use by computers, since many electrical devices have two distinct states: **on** and **off**. They are the numbers computers themselves understand. Composed entirely of zeros and ones, they express all values in powers of two.

The advantage of the binary system is that you only need two symbols (0 and 1) to express any number, no matter how big it is. Since computers are basically just large groups of switches, and since these switches can only be either **on** or **off**, binary system fits right in; you just define **0** as **off** and **1** as **on** and then binary numbers tell the computer which switches to throw.

The table below shows some numbers written in binary and decimal form. Note that writing numbers in binary requires more digits than writing numbers in decimal.

Decimal	Binary	Decimal	Binary
0	0	11	1011
1	1	12	1100
2	10	13	1101
3	11	14	1110
4	100	15	1111
5	101	16	10000
6	110	17	10001
7	111	18	10010
8	1000	19	10011
9	1001	20	10100
10	1010		

VOCABULARY

Well suited = well appropriate = bem adequados, aprorpiados
In powers = em potências
No matter = não importando
Since = uma vez que
Switches = chaves
Either ... or = ou ... ou
Fits = suits = é adequado, apropriado.

Different Kinds of Memory

Read only memory (ROM) – In most computers it is useful to have some of the instructions or whole programs permanently stored inside the computer. There are particular kinds of chips which enable us to do this so that the memory is not lost even when the machine is switched off. These are called ROM chips. ROM stands for "read-only memory". The word "non-volatile" is often used to describe this kind of memory – meaning that it is not destroyed when the power is switched off.

Random-access memory (RAM) – The other kind of memory found inside computers is called RAM. Another name for it is "read/write memory". RAM chips are the kind which lose their contents when the power is lost – so this kind of memory is sometimes also described as "volatile". In the computer, RAM is the working memory.

Back-up memory – The last kind of memory which concerns us is "back-up" memory. This is memory outside the main body of the computer in which programs can be kept for future use or in which data can be kept until the computer is ready to use it. It could be a cassette tape or a magnetic disk.

VOCABULARY

Chip = dispositivo que contém muitos transistores e outros componentes montados sobre uma peça de silício

Enable us = capacita-nos

Random Access memory = tipo de memória da qual a informação pode ser instantaneamente copiada, não importando onde ela esteja localizada; memória de acesso randômico ou aleatório

Concern us = diz respeito a nós, concerne a nós

Programming Languages

Just as there are many human languages, so there are many computer languages. In the early days, people programmed using the computer's binary code, or what we call "machine language". When this became difficult, mnemonics were used to make life easier. This is called "assembly language" programming. Finnally, there are the "high-level" languages like BASIC, FORTRAN and ALGOL. These are much more similar to everyday language, and are translated directly or indirectly into the computer's machine code using the computer's firmware.

BASIC is the language most often used to introduce programming.

VOCABULARY

In the early days = no princípio, no início

Mnemonics = arte de desenvolver a memória mediante processos auxiliares como a associação; mnemônica

To make easier = tornar mais fácil

High-level = alto nível

BASIC = Beginners All-puspose Symbolic Instruction Code

FORTRAN = FORmula TRANslation

ALGOL = ALGOrithmic Language

Firmware = "software" armazenado em ROM em vez de disco

What Is an Algorithm?

An algorithm is a sequence of instructions that tells how to solve a particular problem. Once the problem has been identified, the next step is to select the best method for solving it. If the problem is a familiar one, standardized algorithms may be available from program libraries. But if standard algorithms are not available or suitable, a new algorithm must be written and then added to the program library. An algorithm must be specified exactly, so there can be no doubt about what to do next, and it must have a finite number of steps.

A computer program is an algorithm that is written in a language that a computer can understand, but the same algorithm could be wirtten in several different languages.

VOCABULARY

Once = uma vez
Standardized = padronizados
Added = acrescentado, incorporado
There can be no doubt = não pode haver dúvida
Steps = passos, etapas