Serie of exercises №1

Exercise №1 :

Consider the following source codes

```
Program P1;
Uses wincrt;
Uses windows;
var
      // Variable declaration
begin
      // All instructions
end.
```

```
class P2 {
import java.util.*;
import java.awt.*
// Variable declaration
private int A;
public object B[];
      // Using a function
public function1 (int Z) { All instructions  }
{ //Start of main programl
    { All instructions
} //end
```

```
<!DOCTYPE html>
<html>
<body>

<h1>first program</h1>
<p>first paragraph.</p>

</body>
</html>
```

1/ After translating these three codes, we obtain these two files P1.obj and P2.class for the first two programs, and nothing for program P3. Discuss why, and explain the difference between the two cases.

2/ What do the following instructions represented in the first two codes: **uses wincrt**, **uses windows**, **import java.util.***, **import java.awt.***, **public object B[]**, and **public function1**?

3/ Are these programs ready to run after the translation stage? If not, what needs to be done?

4/ After running the first two programs, we noticed the existence of the following files for **P1: P1.pas**, **P1.obj**, **P1.exe**, and for **P2: P2.java**, **P2.class**. Discuss why.

Exercise №2 :

A set of modules defined as follows is available:

```
module PROGRAMME        taille: 332
                        liens à satisfaire:     OUVRIR
                                                LIRE
                                                FERMER
                                                EDITER
                        adresse lancement:133
module ETIQUETTE        taille: 128
                        liens utilisables:          NOM       10
                                                    SOCIETE   32
                                                    ADRESSE   64
                                                    CODEPOST  96
                                                    VILLE     101
module LECTURE          taille: 840
                        liens utilisables:          OUVRIR    15
                                                    LIRE      340
                                                    FERMER    732
                        liens à satisfaire:     NOM
                                                SOCIETE
                                                ADRESSE
                                                CODEPOST
                                                VILLE
module IMPRESSION       taille: 212
                        liens utilisables:          IMPRIMER 20
module EDITION          taille: 642
                        liens utilisables:          EDITER  10
                        liens à satisfaire:     NOM
                                                SOCIETE
                                                ADRESSE
                                                CODEPOST
                                                VILLE
                                                IMPRIMER
```

Question: Link all these modules. Briefly justify your answer:

- The link table,
- The launch address of the resulting program.
- The implementation addresses of these modules,
- The total size of the resulting program.

Exercise №3 :

1/ Give the structure of a machine instruction, the size in bits for each part in the instruction.

2/ Give the disadvantages of immediate and direct addressing.

3/ Give the contents of registers R1 and R2 in the following cases.

- Mov R1, #50
- Mov R2, 50   (50 is an address of a word containing 300)
  Mov R2, (R1)   (300 is a pointer address to a word containing 1000)

Exercise №4 :

For each line of code, indicate which addressing mode is used:

Immediate, implicit, Register, direct addressing, indirect addressing, indirect addressing with displacement, indirect addressing with index, Indirect addressing with index and displacement

1: strlen: mov   esi, [esp + 5]
2:   mov   eax, 0
3: @@   cmp byte ptr [esi + eax*1], 0
4:   Je   @F
5:   inc   eax
6:   jmp   @B
7:@@   ret

Exercise №5 :

A machine manages 8 peripherals which are associated with interrupt levels, the priority between them increasing from interrupt 0 to interrupt 7. The processor of this machine has a PSW register of the form :

31										0
T (Trap)	M (Mode d'exécution)								CO (codes condition)	

When an interrupt signal arrives, the interrupt system is deactivated and the processor saves the PSW in an area at address 56, then a new status word associated with the interrupt is loaded. The status words corresponding to the 8 interrupts are located from address 120 to 152.

1/ How does the system branch to an interrupt i routine?

2/ Is it necessary to mask other interrupt levels while processing an interrupt i? If so, which ones? Give the mask value associated with each level, assuming that the mask is stored in an 8-bit RM register.

3/ Why is it necessary to disable the system?

4/ Consider a multi-priority interrupt system for a computer containing a printer, hard disk and keyboard with priorities 2, 4 and 5. Show and interpret a diagram of how interrupts are handled when a user is executing a program P starting at time 0, such that an interrupt routine runs for 15 processing units and :

Interruption	Arrival time
Printer	10
Keyboard	20
Disk	25
Printer	30