Corrigé de la feuille d'exercices N°3.

```
1.
  let encode clef s =
  let decal = int_of_char clef - int_of_char 'a'
      and n = string_length s in
  let S = make_string n ' '
      and codeA = int_of_char 'A'
      and codea = int_of_char 'a' in
  for i = 0 to n-1 do
      match s.[i] with
       'a'...'z' as e -> S.[i] <- char_of_int ((int_of_char e - codea + decal) mod 26 + codeA)
      | e -> S.[i] <- e
  done;
  S;;
2.
  let decode clef s =
  let decal = 26 - (int_of_char clef - int_of_char 'a')
      and n = string_length s in
  let S = make_string n ' '
      and codeA = int_of_char 'A'
      and codea = int_of_char 'a'in
  for i = 0 to n-1 do
      match s.[i] with
       'A'...'Z' as e -> S.[i] <- char_of_int ((int_of_char e - codeA + decal) mod 26 + codea)
      | e -> S.[i] <- e
  done;
  S;;
```

3.

```
let analyse texte =
let t = make_vect 26 0 and nb_lettres = ref 0
    and frequence = make_vect 26 0.
    and codea = int_of_char 'a' and codeA = int_of_char 'A' in
for i=0 to string_length texte - 1 do
    match texte.[i] with
      'a'...'z' as c -> let n = int_of_char c - codea in
                      t.(n) <- t.(n)+1; incr nb_lettres</pre>
    | 'A'..'Z' as c -> let n = int_of_char c - codeA in
                      t.(n) <- t.(n)+1; incr nb_lettres</pre>
    | _ -> ()
   done;
for i = 0 to 25 do
   frequence.(i) <- (float_of_int t.(i)) /. (float_of_int !nb_lettres)</pre>
   done;
frequence;;
let distance t1 t2 =
let res = ref 0. and n = vect_length t1 in
let d = make_vect n 0. in
for i = 0 to n-1 do
   res := 0.;
   for j = 0 to n-1 do
       res := !res +. abs_float(t1.(j) -. t2.((j+i) mod n))
       done;
   d.(i) <- !res
   done;
d;;
let mini t =
let imin = ref 0 in
for i = 1 to vect_length t - 1 do
    if t.(i) < t.(!imin) then imin := i
    done;
!imin;;
let decodage texte_ref texte_code =
let fr = analyse texte_ref
    and fc = analyse texte_code in
let decalage = mini(distance fr fc) in
let lettre_codage = char_of_int(decalage + int_of_char 'a') in
    decode lettre_codage texte_code;;
print_string(decodage texte_ref texte_code);;
```