UNIVERSITÉ D'ORLÉANS **DEUG MIAS**
Informatique Année **2002-2003**

Feuille d'exercices OCaml n°1

Correction

Exercice 1. Evaluer la suite d' expressions suivante :

```
let x=0;;
x=0;;
x;;
0;;
2+2;;
x=1;;
if x=1 then 0 else 1;;
let x=1 and y=2;;
let x=y;;
x=y;;
let z=1 and y=z;;
let x=y+1;;
let x=4 in y=4;;
x;;y;;
let y=let x=0 in 4;;
let y=let x=0 and y=4;;
let y=if x=0 then 4 else 5;;
let y= let x=1 in if x=0 then 4 else 5;;
x;;
y;;
let x=2 and y=x+2;;
let x=1 in y=x+2;;
x;;
let y= let x=1 in x+2;;
let x=x+1 and let y=x+4;;
x;; y;;
let x=2 in let y=2;;
let x=2 in let y=2 in x*x+y;;
let x=3 and y=2 in x*x+y;;
let x=2 in let y=x+1 in x*x+y;;
let x=4 and y=x+1 in x*x+y;;
let x=2;;
let x=x*x;;
let x= let x=3 in x*x;;
let x=1;;
let x=2 in x*4;;
x;;
let x = 5 in let x = 2 and y = x*x in 2*y*x;;
let x=1 in let x=x+1 in x+3;;
let x=1 in let x=x+1 and y=x+2 in x+y;;
let x=1 and y=2 and z=3 in y*y-4*x*z;;
let x=1 and x=2 and x=3 in y*y-4*x*z;;
```

Exercice 2. Même question que précédemment ...

```
let f=function x -> 1;;
let f=function x -> x;;
f;;
let f=function x -> x+1;;
let f x= x+1;;
let f(x)=x+1;;
(f 1);;
f 1;;
f(1);;
(f(f 1));;
(f f 1);;
let f=function x -> function y -> x+y;;
(f 1);;
((f 1) 2);;
(f 1 2);;
f (1,2);;

f(1 2);;

let f=function x -> (f x);;
(f 1);;
(f 1 2);;
let g=function x -> (f x);;
(g 1);;
(g 1 2);;
let h=function x -> (h x);;
let x=3 in ((function x -> x+x) 4);;
let x=3 in ((function y -> y+y) x);;
let x=3 in ((function y -> x+y) 4);;
let y=4 in let x=3 in ((function y -> x+y) y);;
let y=4 in let x=3 in ((function y -> x+y) x);;
let f= function (x-> let y=2 in x+y);;

let f= function x-> let y=2 in x+y;;
let f= function x-> let y=2 and let x=x+y;;
let x=7 in let f(y)=y*x
   in let x=true in if x then (f 3) else (f 2);;
let x=1+2 in ((function  y->y+x) x);;
let x=1+2 in ((function  x->x+x) x);;
let x = 5 in  let x = 4
   in let f = function x -> x*x in f x;;
```

Exercice 3. Soient f et g deux fonctions respectivement déclarées par

`let f = function x ->  x ;;` et `let g= function h -> function x -> (h x) ;;`

Quel est leur type ? Evaluer les expressions suivantes :

```
let h = function x -> x+1 ;;
(f 1) ;;
(f h) ;;
(f h 1) ;;
(g 1) ;;

(g h) ;;
(g h 1) ;;
let g2 = function h ->
   function x -> (h x+1) in (g2 h 1) ;;
let f1 = function f2 -> (function x -> f2 x) in
   let g = function x -> x+1 in f1 g 2 ;;
```

Exercice 4. Ecrire une fonction *implique* qui pour deux booléens A et B calcule la valeur de vérité de $A \Rightarrow B$.

Évaluer les expressions suivantes :

```
(implique false);;
let f=(implique false) in (f true);;
implique (false);;
implique true false;;
implique false false;;
implique (true false);;
```

Exercice 5. Ecrire une fonction *concat* qui prend trois chaines de caractères et les concatène.
Évaluer les expressions suivantes :

```
let f = concat "toto" in
            let g = (f " est ") in (g "la");;
let f=(concat "toto");;
let f=(f " a ");;
let f=(f "faim");;
(f "?");;
f;;
(concat "toto" " plus " "faim");;
(((concat "ben")" si ")"finalement");;
```