

Corrigé de la Composition d'Informatique

Les Principes des Langages de Programmation (INF 321)

Promotion 2008

Sujet proposé par Gilles Dowek

6 juillet 2008

Exercice 1

1.

```
static int c(List l) {  
  if (l == null) return 0;  
  if (l.hd == 0) return 1 + c(l.tl);  
  return 0;}  
}
```

Exercice 2

1.

```
static int f(int n) {  
  if (n % 2 == 1) return 0;  
  if (n == 4) return 4;  
  return 6;}  
}
```

Exercice 3

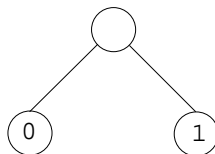
1. 2^n

2. 1 1 1 1 0 0 1 1

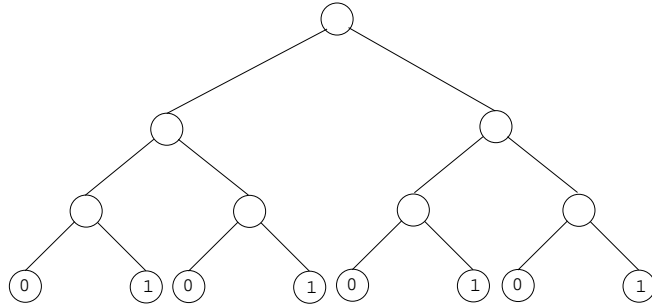
3.

```
static List feuilles(Arbre a, int n) {  
  if (n == 0) {return new List (a.val,null);}  
  {Arbre g; Arbre d;  
   if (a.gauche == null) {g = a;} else {g = a.gauche;}  
   if (a.droite == null) {d = a;} else {d = a.droite;}  
   return List.append (feuilles(g,n-1),feuilles(d,n-1));}}  
}
```

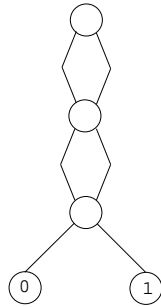
4.



5.



6.



7. À compresser une suite d'entiers.

Exercice 4

1.

```
static void c (int x, int y, int n) {  
    if (n != 1) { noir(x,y,n/2); c(x,y+n/2,n/2); c(x+n/2,y+n/2,n/2); }}
```

```
public static void main (String [] args){  
    c(0,0,256);}
```

Exercice 5

1. 3

2. 3