Corrigé du TP 2

Séquences

```
> restart;
> S:=1,a,2,a,7,B;
```

$$S := 1, a, 2, a, 7, B$$

```
> whattype(S);
```

$$exprseq$$

```
> S[3];
```

$$2$$

```
> S[7];
Error, invalid subscript selector
```

```
> T:=x,F,9,a;
```

$$T := x, F, 9, a$$

```
> U:=S,T;
```

$$U := 1, a, 2, a, 7, B, x, F, 9, a$$

```
> V:=a$8;
```

$$V := a, a, a, a, a, a, a, a$$

```
> W:=seq(1/n,n=1..100);
```

$$W := 1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}, \frac{1}{12}, \frac{1}{13}, \frac{1}{14}, \frac{1}{15}, \frac{1}{16}, \frac{1}{17}, \frac{1}{18}, \frac{1}{19}, \frac{1}{20}, \frac{1}{21}, \frac{1}{22}, \frac{1}{23}, \frac{1}{24}, \frac{1}{25}, \frac{1}{26}, \frac{1}{27},$$
$$\frac{1}{28}, \frac{1}{29}, \frac{1}{30}, \frac{1}{31}, \frac{1}{32}, \frac{1}{33}, \frac{1}{34}, \frac{1}{35}, \frac{1}{36}, \frac{1}{37}, \frac{1}{38}, \frac{1}{39}, \frac{1}{40}, \frac{1}{41}, \frac{1}{42}, \frac{1}{43}, \frac{1}{44}, \frac{1}{45}, \frac{1}{46}, \frac{1}{47}, \frac{1}{48}, \frac{1}{49}, \frac{1}{50}, \frac{1}{51}, \frac{1}{52},$$
$$\frac{1}{53}, \frac{1}{54}, \frac{1}{55}, \frac{1}{56}, \frac{1}{57}, \frac{1}{58}, \frac{1}{59}, \frac{1}{60}, \frac{1}{61}, \frac{1}{62}, \frac{1}{63}, \frac{1}{64}, \frac{1}{65}, \frac{1}{66}, \frac{1}{67}, \frac{1}{68}, \frac{1}{69}, \frac{1}{70}, \frac{1}{71}, \frac{1}{72}, \frac{1}{73}, \frac{1}{74}, \frac{1}{75}, \frac{1}{76}, \frac{1}{77},$$
$$\frac{1}{78}, \frac{1}{79}, \frac{1}{80}, \frac{1}{81}, \frac{1}{82}, \frac{1}{83}, \frac{1}{84}, \frac{1}{85}, \frac{1}{86}, \frac{1}{87}, \frac{1}{88}, \frac{1}{89}, \frac{1}{90}, \frac{1}{91}, \frac{1}{92}, \frac{1}{93}, \frac{1}{94}, \frac{1}{95}, \frac{1}{96}, \frac{1}{97}, \frac{1}{98}, \frac{1}{99}, \frac{1}{100}$$

Listes

```
> restart;
> M:=[2,8,4,x,z^2];
```

$$M := [2, 8, 4, x, z^2]$$

```
> whattype(M);
```

$$list$$

```
> M[4];
```

$$x$$

```
> op(4,M);
```

$$x$$

```
> op(3..5,M);
```

$$4, x, z^2$$

```
> op(M);
```

$$2, 8, 4, x, z^2$$

```
> nops(M);
```

$$5$$

```
> convert(M,'+');
```

$$14 + x + z^2$$

```
> convert(M,'*');
```

$$64\, x\, z^2$$

```
> N:=[2,8,4,9,1,7,13];
```

$$N := [2, 8, 4, 9, 1, 7, 13]$$

```
> sort(N);
```

$$[1, 2, 4, 7, 8, 9, 13]$$

```
> select(isprime,N);
```

$$[2, 7, 13]$$

```
> remove(isprime,N);
```

$$[8, 4, 9, 1]$$

```
> P:=["juliette","alice","Alain","Margot","hector","bernard","Loui
  s"];
>
```

$$P := [\text{"juliette"}, \text{"alice"}, \text{"Alain"}, \text{"Margot"}, \text{"hector"}, \text{"bernard"}, \text{"Louis"}]$$

```
> sort(P,lexorder);
```

$$[\text{"Alain"}, \text{"Louis"}, \text{"Margot"}, \text{"alice"}, \text{"bernard"}, \text{"hector"}, \text{"juliette"}]$$

```
> Q:=[M,N];
```

$$Q := [[2, 8, 4, x, z^2], [2, 8, 4, 9, 1, 7, 13]]$$

```
> Q:=[op(M),op(N)];
```

$$Q := [2, 8, 4, x, z^2, 2, 8, 4, 9, 1, 7, 13]$$

Ensembles

```
> restart;
> E:={a,b,a,b,c};
```

$$E := \{a, b, c\}$$

```
> whattype(E);
```

$$set$$

```
> F:={b,c,d,e,f};
```

$$F := \{b, c, d, e, f\}$$

```
> E union F;
```

$$\{a, b, c, d, e, f\}$$

```
> E intersect F;
```

$$\{b, c\}$$

```
> E minus F;
```

$$\{a\}$$

```
> member(a,E);
```

$$true$$

```
> member(a,F);
```

$$false$$

```
> C:={c,b,a};
```

$$C := \{a, b, c\}$$

```
> evalb(E=C);
```

$$true$$

Chaines de caractères

```
> mot1:="bonjour";
```

mot1 := "bonjour"

```
> mot2:=" les amis";
```

mot2 := " les amis"

```
> mot1[1..3];
```

"bon"

```
> cat(mot1,mot2);
```

"bonjour les amis"

Instruction IF

```
> n:=1221;
```

n := 1221

```
> if isprime(n)
  then print(n," est un nombre premier");
  else print(n," n’est pas un nombre premier");
  end;
```

1221, " n’est pas un nombre premier"

Instruction FOR

```
> for n from 1 to 50 by 2 do print(n);end do;
```

1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47

```
> S:=1;
```

$$S := 1$$

```
> for i from 1 to 10 do T:=S+1/i^2;end do;
```

$$T := 2$$

$$T := \frac{5}{4}$$

$$T := \frac{10}{9}$$

$$T := \frac{17}{16}$$

$$T := \frac{26}{25}$$

$$T := \frac{37}{36}$$

$$T := \frac{50}{49}$$

$$T := \frac{65}{64}$$

$$T := \frac{82}{81}$$

$$T := \frac{101}{100}$$

```
> for i from 1 to 10 do S:=S+1/i^2;end do;
```

$$S := 2$$

$$S := \frac{9}{4}$$

$$S := \frac{85}{36}$$

$$S := \frac{349}{144}$$

$$S := \frac{8869}{3600}$$

$$S := \frac{8969}{3600}$$

$$S := \frac{443081}{176400}$$

$$S := \frac{1783349}{705600}$$

$$S := \frac{16128541}{6350400}$$

$$S := \frac{3238409}{1270080}$$

instruction WHILE

```
> restart;
> n:=352;m:=n;p:=0;
```

$$n := 352$$

$$m := 352$$

$$p := 0$$

```
> while type(m,even) do m:=m/2;p:=p+1;od;
```

$$m := 176$$

$$p := 1$$

$$m := 88$$

$$p := 2$$

$$m := 44$$

$$p := 3$$

$$m := 22$$

$$p := 4$$

$$m := 11$$

$$p := 5$$

procédures

```
> restart;
> exposant_de_2:=proc(n::integer)
  local m,p;
  m:=n;p:=0;
  while type(m,even) do m:=m/2:p:=p+1: od;
  return p;
  end proc;
```

exposant_de_2 := **proc**(*n*::*integer*)

local *m*, *p*;

m := *n*; *p* := 0; **while** type(*m*, *even*) **do** *m* := 1 / 2∗*m*; *p* := *p* + 1 **end do**; **return** *p*

end proc

```
> exposant_de_2(352);
```

5

```
> exposant_de_2(1024);
```

10

```
> exposant_de_2(897641);
```

0

```
> exposant_de_2(2.3);
Error, invalid input: exposant_de_2 expects its 1st argument, n, to be of type
integer, but received 2.3
```

Exercices

```
> restart;
> somme:=proc(a::numeric,b::numeric) ## marche avec les entiers et
  les flottants
  return a+b;
  end proc;
```

somme := **proc**(*a*::*numeric*, *b*::*numeric*) **return** $a + b$ **end proc**

```
> somme(5,6);
```

11

```
> somme(-7,8);
```

1

```
> somme(1.1,67);
```

68.1

```
> restart;
> aplus2b:=proc(a::numeric,b::numeric)
  return a+2*b;
  end proc;
```

aplus2b := **proc**(*a*::*numeric*, *b*::*numeric*) **return** $a + 2*b$ **end proc**

```
> aplus2b(1,1);
```

3

```
> aplus2b(5.5,7.9);
```

21.3

```
> restart;
> grandplus2petit:=proc(a::numeric,b::numeric)
  if a>b then return a+2*b;
         else return b+2*a;
  end if;
  end proc;
```

grandplus2petit :=

proc(*a*::*numeric*, *b*::*numeric*) **if** $b < a$ **then return** $a + 2*b$ **else return** $b + 2*a$ **end if end proc**

```
> grandplus2petit(7,2.5);
```

12.0

```
> restart;
> maximum:=proc(l::list)
  local n,maxi,j;
  n:=nops(l);
  maxi:=l[1];
  for j from 1 to n do
    if l[j]>maxi then maxi:=l[j];fi;
  od;
  return maxi;
  end proc;
```

maximum := **proc**(*l*::*list*)

local *n*, *maxi*, *j*;

n := nops(*l*);

maxi := *l*[1];

for *j* **to** *n* **do if** *maxi* < *l*[*j*] **then** *maxi* := *l*[*j*] **end if end do**;

return *maxi*

```
end proc
> maximum([1,29,65,32,-10,3]);
                                    65
>
```