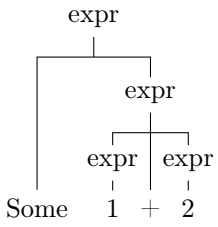
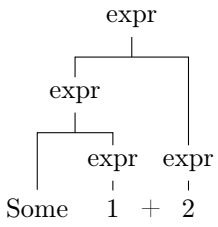
TD Révision

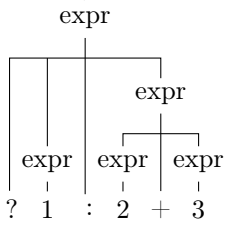
1 Analyse syntaxique

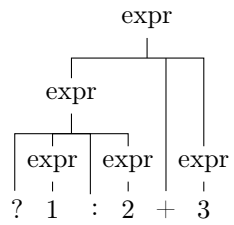
1. — Some 1 + 2



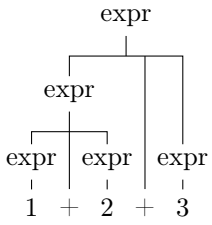


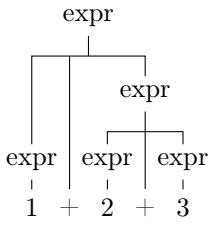
— ? 1 : 2 + 3





— 1 + 2 + 3





2. Le plus prioritaire est l'option puis l'adition

```
%nonassoc SOME
%left PLUS
%nonassoc COLON
```

2 Types

1. expression $?e_1 : e_2$

$$\frac{\Gamma \vdash e_1 : \tau \text{ option} \quad \Gamma \vdash e_2 : \tau}{\Gamma \vdash ?e_1 : e_2 : \tau}$$

2. $\Gamma(x) = \text{int}, \Gamma(y) = \text{int option}$
   (a) Pas bien typée (int + int option) pas possible
   (b) Bien typée (int)

$$\frac{\dfrac{\Gamma(x) = \text{int}}{\Gamma \vdash x : int} \quad \dfrac{\dfrac{\Gamma(y) = \text{int option}}{\Gamma \vdash y : \text{int option}} \quad \dfrac{}{42 : int}}{\Gamma \vdash ?y : 42 : \text{int}}}{\Gamma \vdash x + ?y : 42 : \text{int}}$$

   (c) Bien typée (int option)

$$\frac{\dfrac{}{\Gamma \vdash \text{None} : (\text{int option}) \text{ option}} \quad \dfrac{\dfrac{\dfrac{\Gamma(y) = \text{int option}}{y : \text{int option}}}{\Gamma \vdash ?\text{Some } y : (\text{int option}) \text{ option}} \quad \dfrac{\dfrac{\Gamma(x) = int}{\Gamma \vdash x : int}}{\Gamma \vdash \text{Some } x : \text{int option}}}{\Gamma \vdash ?\text{Some } y : \text{Some } x : \text{int option}}}{\Gamma \vdash ?\text{None} : (?\text{Some } y : \text{Some } x) : \text{int option}}$$

3. Montrons (`?Some e: Some d` bien typée ⇔ `Some (?a:d)` bien typée)

   ⇒ : Supossons $\Gamma \vdash$ `?Some e : Some d` $: \tau$ est dérivable.
   Inversion : nécessairement, $\Gamma \vdash$ `Somme e` $: \tau$ option
   et $\Gamma \vdash$ `Some d` $: \tau$
   et $\Gamma \vdash$ `e` $: \tau$ option
   et $\Gamma \vdash$ `d` $: \alpha$ option ($\tau = \alpha$ option)

$$\dfrac{\dfrac{\dfrac{\vdots}{\Gamma \vdash \texttt{e} : \alpha \text{ option} = \tau} \quad \dfrac{\vdots}{\Gamma \vdash \texttt{d} : \alpha}}{\Gamma \texttt{?e:d} : \alpha}}{\Gamma \vdash \texttt{Some(?e:d)} : \tau (= \alpha \text{ option})}$$

   ⇐ : Similaire

3 Compilation

Exercice 1 – Compilation vers de valeurs optionnelles :

1. Description :

registre	valeurs
$\$a0$	8
$\$v0$	0x10040008
$\$t0$	1

0x10040000	1
	2
0x10040008	1
	0x10040000

2. $\$a0$ = 0x10040000
   Tas :

0x10040000	1
	0x10040008
0x10040008	1
	0x10040010
0x10040010	1
	3

3. récupère la valeur n de `Somme (Somme n)` dans le registre $\$v0$

```
lw $v0, 4($a0)
lw $v0, 4($v0)
```

4. code de la fonction f :

```
f:
  beqz  $a0, N
  lw    $v0, 4($a0)
  addi  $v0, $v0, 1
  jr    $ra
  N:
    li $v0, -1
    jr $ra
```

5. Code :

```
    bnez    $a0, some

    bnez    $a1, incompatible
    li      $v0, 1
    b       fin
some:
    beqz    $a1, incompatible

    lw      $a0, 4($a0)
    lw      $a1, 4($a0)
    seq     $v0, $a0, $a1
    b fin
incompatible:
    li      $v0, 0
fin:
```