

## 11 Case and Let Expressions

### 1. **value**

```

f : Nat → Nat
f(n) ≡
  case n of
    0 → 0,
    1 → 1,
    _ → f(n-2) + 2 * f(n-1)
  end

```

### 2. (a) **value**

```

enlarge : Figure → Figure
enlarge(fig) ≡
  case fig of
    box(l,w) → box(2.0*l, 2.0*w),
    circle(r) → circle(2.0*r)
  end

```

(b)  $\text{enlarge}(\text{box}(5.0,3.0)) \equiv \text{box}(10.0,6.0)$

### 3. **value**

```

rm3w : Colour* → Colour*
rm3w(l) ≡
  case l of
    ⟨c1,c2,=white⟩ ^ l → ⟨c1,c2⟩ ^ l,
    _ → l
  end

```

### 4. **type** Elem

#### **value**

```

dunion : (Elem-set)-set → Elem-set
dunion(ss) ≡
  if ss = {} then {}
  else
    let s : Elem-set • s ∈ ss in s ∪ dunion(ss \ {s}) end
  end

```

alternatively

#### **value**

```

dunion : (Elem-set)-set → Elem-set
dunion(ss) ≡ {e | e : Elem • (∃ s : Elem-set • e ∈ s ∧ s ∈ ss)}

```