Linear Programming

Let's start making a linear program!

```
p = MixedIntegerLinearProgram(maximization=False, solver="GLPK");
```

Add variables w_0, w_1, w_2, w_3.

```
w = p.new_variable();
```

Set $w_i \geq 0$.

```
for i in range(4):
    p.set_min(w[i], 0);
    p.set_integer(w[i]);
w
```

```
    MIPVariable of dimension 1.
```

Add constraints.

$w_0 + w_1 + w_2 - 14w_3 = 0$

```
p.add_constraint( w[0] + w[1] + w[2] - 14*w[3] == 0 );
```

```
p.add_constraint( w[1] + 2*w[2] -8*w[3] == 0);
p.add_constraint( 2*w[2] - 3*w[3] == 0);
p.add_constraint( w[0] - w[1] - w[2] >= 0 );
p.add_constraint( w[3] >= 1);
```

```
p.set_objective( w[0] + w[3] );
```

```
p.show();
```

```
    Minimization:
      x_0 +x_3
```

```
    Constraints:
      0.0 <= x_0 +x_1 +x_2 -14.0 x_3 <= 0.0
      0.0 <= x_1 +2.0 x_2 -8.0 x_3 <= 0.0
      0.0 <= 2.0 x_2 -3.0 x_3 <= 0.0
      -x_0 +x_1 +x_2 <= 0.0
      -x_3 <= -1.0
      0.0 <= x_0 +x_1 +x_2 -14.0 x_3 <= 0.0
      0.0 <= x_1 +2.0 x_2 -8.0 x_3 <= 0.0
      0.0 <= 2.0 x_2 -3.0 x_3 <= 0.0
      -x_0 +x_1 +x_2 <= 0.0
      -x_3 <= -1.0
    Variables:
      x_0 is an integer variable (min=0.0, max=+oo)
      x_1 is an integer variable (min=0.0, max=+oo)
      x_2 is an integer variable (min=0.0, max=+oo)
      x_3 is an integer variable (min=0.0, max=+oo)
```

```
p.solve()
```

```
    17.0
```

```
p.get_values( [ w[i] for i in range(4) ] );
```

```
    [15.0, 10.0, 3.0, 2.0]
```

```

```

evaluate