A Sample Document
for the Usages of lstEventB Package

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For convenient, we define macro `\eventB` for Event-B.

We start first with some inline Event-B code by embedding them using a pair of |, for example `|@grd1: "SNSR = FALSE"|` gives @grd1: "SNSR = FALSE". Any Event-B formulae including Unicode symbols will be typeset using the `bsymb` package accordingly.

More complete piece of code (including the Unicode symbols) can be typeset using the `EventBcode` environment. Below is the typesetting of an Event-B machine.

```
 1  machine Sensor_m0_SNSR
 2  variables
 3    SNSR
 4  invariants
 5    @thm0_1: "SNSR ∈ BOOL" theorem
 6  events
 7
 8    INITIALISATION
 9    begin
10      @act1: "SNSR := FALSE"
11    end
12
13    SNSR_on
14    when
15      @grd1: "SNSR = FALSE"
16    then
17      @act1: "SNSR := TRUE"
18    end
19
20    SNSR_off
21    when
22      @grd1: "SNSR = TRUE"
23    then
24      @act1: "SNSR := FALSE"
25    end
26
27  end
```

One can change the different colour options. For example, `\EventBSetKeywordColour{blue!50!black}` will change the keyword colour to dark blue. (This has effects only when

```
1  machine Sensor_m0_SNSR
2  variables
3    SNSR
4  invariants
5    @thm0_1: "SNSR ∈ BOOL" theorem
```

One can includes external file containing Event-B code using the `\EventBinputlisting` command. For example the following is the result of including the code in the file `Sensor_m1_DEP.bumx` using `\EventBinputlisting{Sensor_m1_DEP.bumx}`.

```
1   machine Sensor_m1_DEP
2   refines Sensor_m0_SNSR
3   variables
4     SNSR
5     DEP
6   invariants
7     @inv0_1: "DEP ∈ ℕ"
8   events
9
10    INITIALISATION extended
11    begin
12      @act2: "DEP := 0"
13    end
14
15    SNSR_on extended
16    refines SNSR_on
17    end
18
19    SNSR_off extended
20    refines SNSR_off
21    begin
22      @act2: "DEP := DEP + 1"
23    end
24
25  end
```

More specifically, one can specify more details on the inclusion, e.g., the ranges, as the following example `\EventBinputlisting[firstline=16,lastline=20]{Sensor_m2_snsr.bumx}` gives

```
1   @inv1_1: "Snsr_01 = TRUE ⇒ SNSR = TRUE"
2
3   @inv1_2: "Snsr_10 = TRUE ⇒ SNSR = FALSE"
4
5   @inv1_3: "Snsr_01 = FALSE ∨ Snsr_10 = FALSE"
```

```
1  machine Sensor_m3_Ctrl
2
3  refines
4
5     Sensor_m2_Snsr
6
7  variables
8
9     SNSR
10
11    DEP
12
13    Snsr_01
14
15    Snsr_10
16
17    ctrl_snsr
18
19    ctrl_dep
20
21    ctrl_snsr_01
22
23    ctrl_snsr_10
24
25 invariants
26
27    @inv2_1:
28    "Snsr_01 = FALSE ∧Snsr_10 = FALSE ∧ctrl_snsr_01 = FALSE ∧ctrl_snsr_10 =
             FALSE ⇒ctrl_snsr = SNSR"
29
30    @inv2_2: "ctrl_dep ∈ ℕ"
31
32    @inv2_3: "Snsr_10 = FALSE ∧ctrl_snsr_10 = FALSE ⇒ctrl_dep = DEP"
33
34    @inv2_4: "Snsr_10 = TRUE ∨ctrl_snsr_10 = TRUE ⇒ctrl_dep = DEP  1"
35
36    @inv2_5: "ctrl_snsr_01 = TRUE ⇒SNSR = TRUE"
37
38    @inv2_6: "ctrl_snsr_10 = TRUE ⇒SNSR = FALSE"
39
40    @inv2_7: "ctrl_snsr_01 = TRUE ⇒Snsr_01 = FALSE"
41
42    @inv2_8: "ctrl_snsr_10 = TRUE ⇒Snsr_10 = FALSE"
43
44 events
45
46    INITIALISATION extended
47    refines INITIALISATION
48    begin
49      @act5: "ctrl_snsr := FALSE"
50      @act6: "ctrl_dep := 0"
51      @act7: "ctrl_snsr_01 := FALSE"
52      @act8: "ctrl_snsr_10 := FALSE"
53    end
54
```

```
55    SNSR_on extended
56    refines SNSR_on
57    when
58      @grd3: "ctrl_snsr_10 = FALSE"
59    end

60
61    SNSR_off extended
62    refines SNSR_off
63    when
64      @grd3: "ctrl_snsr_01 = FALSE"
65    end

66
67    ctrl_Senses_Snsr_01 extended
68    refines ctrl_Senses_Snsr_01
69    begin
70      @act2: "ctrl_snsr_01 := TRUE"
71    end

72
73    ctrl_Senses_Snsr_10 extended
74    refines ctrl_Senses_Snsr_10
75    begin
76      @act2: "ctrl_snsr_10 := TRUE"
77    end

78
79    ctrl_on
80    when
81      @grd1: "ctrl_snsr_01 = TRUE"
82    then
83      @act1: "ctrl_snsr_01 := FALSE"
84      @act2: "ctrl_snsr := TRUE"
85    end

86
87    ctrl_off
88    when
89      @grd1: "ctrl_snsr_10 = TRUE"
90    then
91      @act1: "ctrl_snsr_10 := FALSE"
92      @act2: "ctrl_snsr := FALSE"
93      @act3: "ctrl_dep := ctrl_dep + 1"
94    end

95
96  end
```