## Case studies for the paper “Evrostos: The rLTL Verifier”.

These are the instructions to replicate the case studies for the paper “Evrostos: The rLTL Verifier”.
You will use Evrostos: The rLTL Verifier. Instructions on how to install Evrostos are in the README.md file.

**1. Section 2: Motivational Example:**

The files needed for this simulation are:

- input_mot_example.txt
- mot_example_aac.smv

Run the following on the terminal from inside the Evrostos directory:

```
./evrostos -I
```

The terminal looks as follows:

```
Enter the rLTL specification input file name (.txt):
```

*You enter:*
*./examples/input_mot_example.txt*

```
Enter the model file name (.smv):
```

*You enter:*
*./examples/mot_example.smv*

```
Enter file name (.txt) for the report:
```

*You enter:*
*mot_exampleReport.txt*

Now the result of the rLTL model checking is in the report file.

Legend:

- atomic proposition “ta12non" stands for "alert12 = non”;
- atomic proposition “ta13non" stands for "alert13 = non”;
- atomic proposition “tsctr1" stands for "tsafeControl1”.

**2. Section 5: Telephone System Model (rLTL):**

The files needed for this simulation are:

- inputPhone_rLTL.txt
- telephone.smv

Run the following on the terminal from inside the Evrostos directory:

```
./evrostos -I
```

The terminal looks as follows:

```
Enter the rLTL specification input file name (.txt):
```

*You enter:*
*./examples/inputPhone_rLTL.txt*

```
Enter the model file name (.smv):
```

*You enter:*
*./examples/telephone.smv*

```
Enter file name (.txt) for the report:
```

*You enter:*

*telephone_rLTL_Report.txt*

Now the result of the rLTL model checking is in the report file.

**3. Section 5: Automated Aircraft Control System Model (Original) (rLTL):**

The files needed for this simulation are:

- inputAAC_rLTL.txt
- aac_original.smv

Run the following on the terminal from inside the Evrostos directory:

```
./evrostos -I
```

The terminal looks as follows:

```
Enter the rLTL specification input file name (.txt):
```

*You enter:*
*./examples/inputAAC_rLTL.txt*

```
Enter the model file name (.smv):
```

*You enter:*
*./examples/aac_original.smv*

```
Enter file name (.txt) for the report:
```

*You enter:*
*aac_original_rLTL_Report.txt*

Now the result of the rLTL model checking is in the report file.

**4. Section 5: Automated Aircraft Control System Model (Abstract) (rLTL):**

The files needed for this simulation are:

- inputAAC_rLTL.txt
- aac_abstract.smv

Run the following on the terminal from inside the Evrostos directory:

```
./evrostos -I
```

The terminal looks as follows:

```
Enter the rLTL specification input file name (.txt):
```

*You enter:*
*./examples/inputAAC_rLTL.txt*

```
Enter the model file name (.smv):
```

*You enter:*
*./examples/aac_abstract.smv*

```
Enter file name (.txt) for the report:
```

*You enter:*
*aac_abstract_rLTL_Report.txt*

Now the result of the rLTL model checking is in the report file.

**5. References:**


- Evrostos: The rLTL Verifier
  Tzanis Anevlavis, Daniel Neider, Matthew Philippe and Paulo Tabuada
  *To appear in* the 22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019).

- A. Cimatti, E. Clarke, E. Giunchiglia, F. Giunchiglia, M. Pistore, M. Roveri, R. Sebastiani, and A. Tacchella.
  "NuSMV 2: An OpenSource Tool for Symbolic Model Checking".
  In Proc. CAV'02, LNCS. Springer Verlag, 2002.

- Telephone System Model:
  Malte Plath and Mark Ryan. 2001. Feature integration using a feature construct. Science of Computer Programming 41, 1 (2001), 53 – 84.

- Automated Air Traffic Control System Model:
  Yang Zhao and Kristin Yvonne Rozier. 2014. Formal Specification and Verification of a Coordination Protocol for an Automated Air Traffic Control System. Sci. Comput. Program. 96, P3 (Dec. 2014), 337–353.