

## V. ANNEX

This section describes how this demo paper will be presented at the RE21 conference. For the Demos session, we will illustrate the capabilities of the ARF Tool.

## VI. ARF USER INTERFACE

A user can load a requirements text file of interest, where requirements are separated with a special character that is provided in the setting (e.g., Fig.3(b) shows a sample of requirements file). Then, the processing mode is adjusted "extraction", "extraction and formalisation" before starting the process as in Fig.3(a). After processing, the user shall be provided with a list of the processed requirements as indicated in Fig. 4. By selecting any of these requirements:

- The corresponding extracted RCM is visualised in the right view in a tree format.
- The abstract and detailed formula(s) are displayed in the bottom (if formalisation is selected in the processing mode).

The extraction and formalisation views change as per the selected requirement. You can visualise either the entire RCM of the requirement by selecting the requirement as in Fig. 5 or just visualise one primitive requirement as in Fig. 4 by selecting the intended sentence. This adds more flexibility for

users to navigate through the requirements. The tree view of the extraction breakdown increases the understandability of the requirement sentence by:

- Providing a single meaning to the sentence.
- Adding semantic to each portion of the text.
- Drawing the internal relations among existing properties in the sentence which is very effective if the requirement sentence is too long.

In addition, the encapsulation of the sentences of the same requirement together helps in understanding the correlation among them.

Fig. 5 and Fig. 6 present the MTL and CTL formulas for the same primitive requirement. As seen in the figures, RCM holds the same extraction of the input requirement. However, the generated formula presents information based on the utilised formal notation capabilities. For example, in the requirement sentence "after RCMVAR\_X is RCMVAL\_true for 2 seconds, the entry whose index is larger than 2 shall be set to 1", there is a time notation that is supported by MTL but not CTL and branching (due to the existence of a relative clause) that is supported by CTL but not MTL. Thus, the corresponding generated formulas present the information based on their capabilities. This shows the flexibility of the tool in providing different notations of the same requirement.

ARF in addition to a demonstrative video are available online <sup>5</sup>

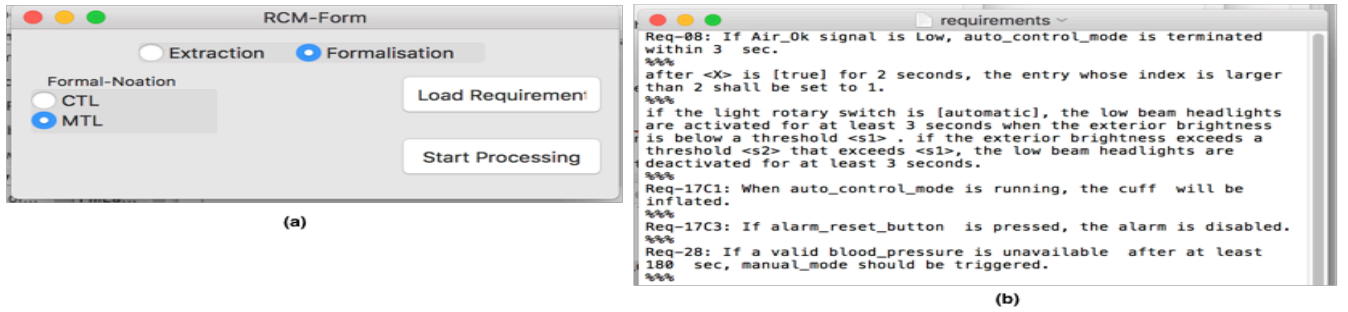


Fig. 3: Main-View of ARF Tool and Sample Requirements Input File

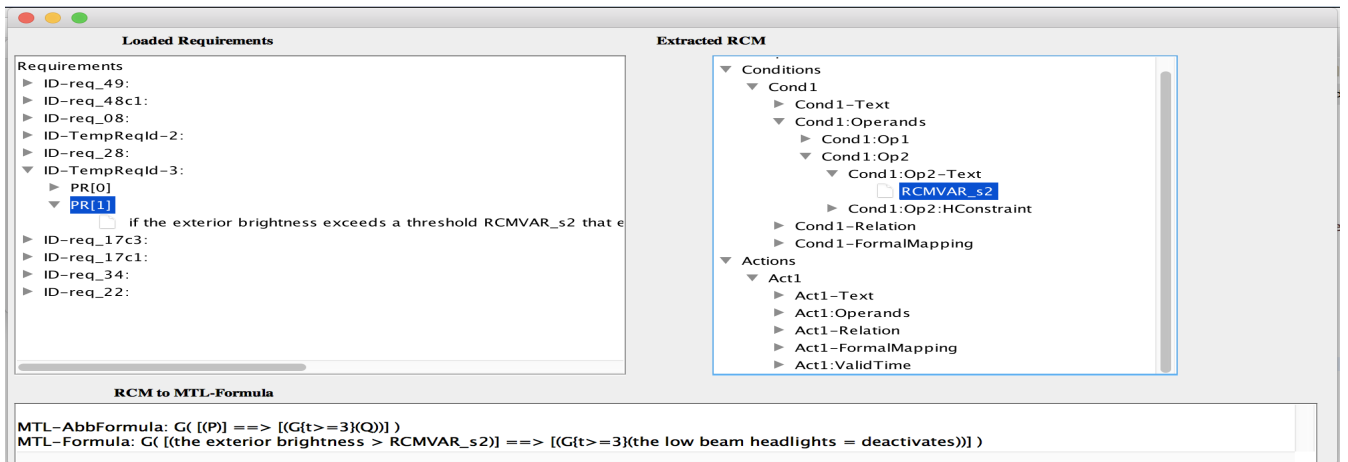


Fig. 4: Visualising one Primitive requirement

<sup>5</sup>ARF Tool and Demo: <https://github.com/ABC-7/ARF>

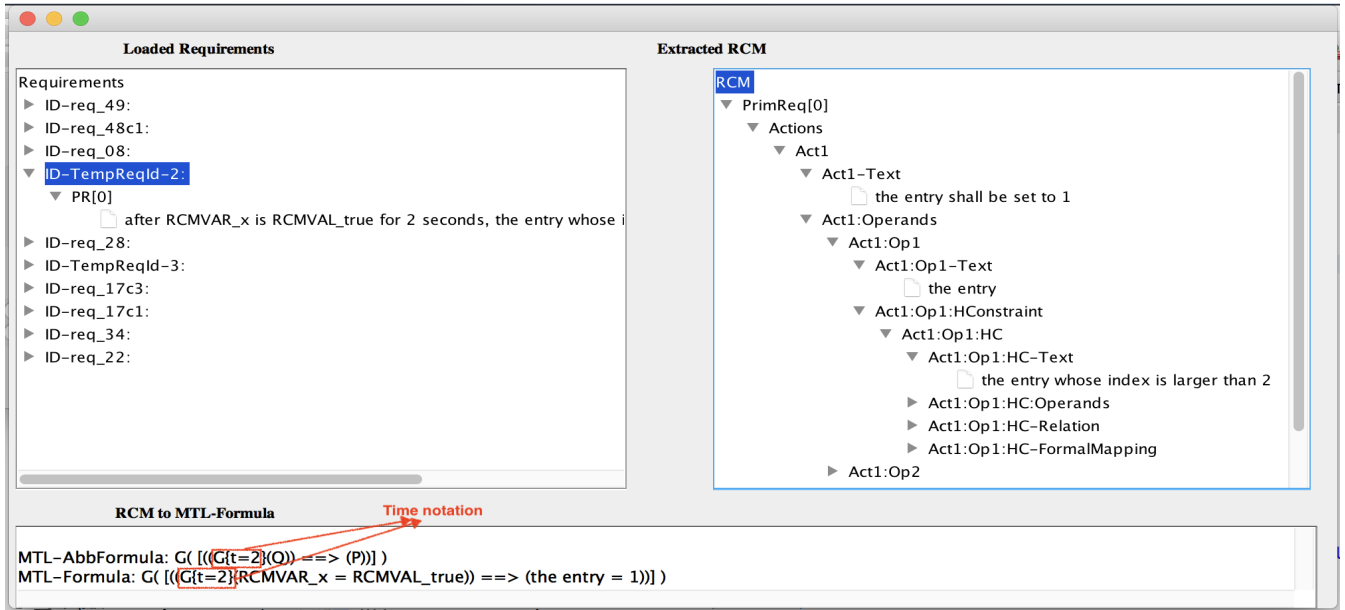


Fig. 5: One RCM Visualisation and the corresponding MTL Formula

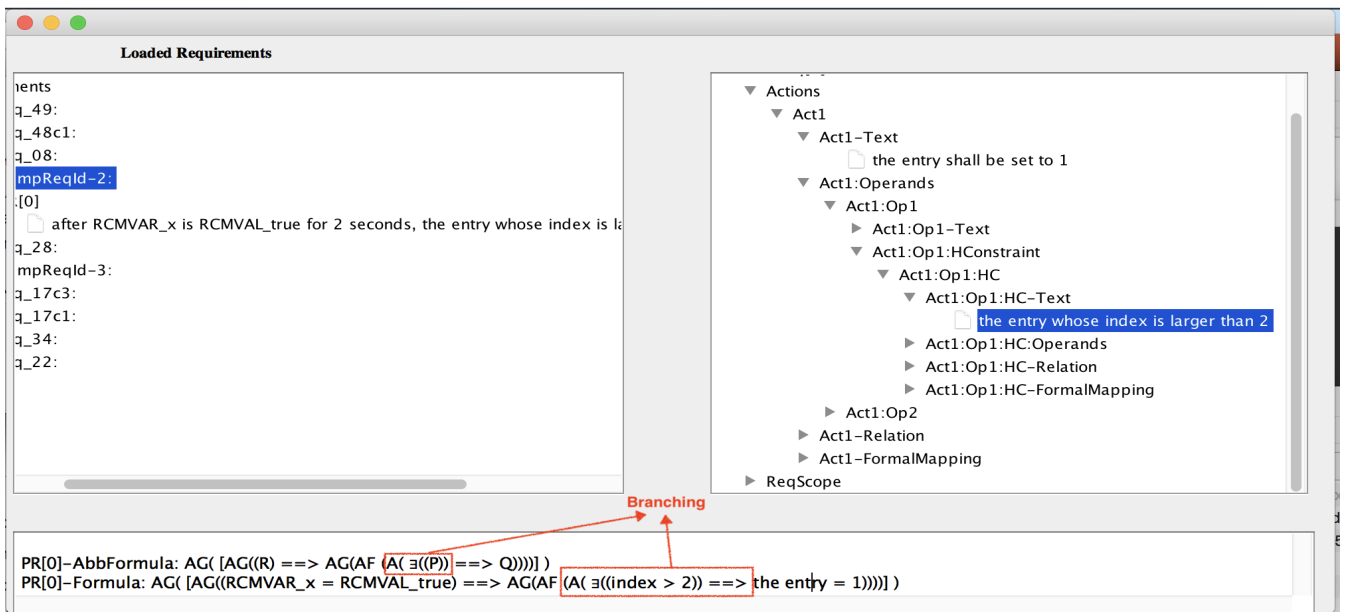


Fig. 6: The RCM of the same requirement visualised in Fig 5 and the corresponding CTL formula