

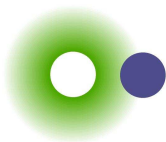
# COMP6463: Temporal Logic and Model Checking

Assessable Exercise

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## An Extended Exercise

Download and learn how to use the SMV (or NuSMV) model checker.

Model the Missionaries and Cannibals problem:

*Three missionaries and three cannibals come to a river and find a boat that holds two. If the cannibals ever outnumber the missionaries on either bank, the missionaries will be eaten.*

*How shall they cross?*

Set up a safety property whose violation gives a counter-example that solves the puzzle.

- In other words, state a goal that is false, and which is falsified by a path leading to the state where all the missionaries and cannibals are on the right bank.

# SMV and You

## 1 Get it.

- Google “SMV model checker”.
- Go to CMU web-site
- Download tar file

Alternatively (for Windows users without compiler):

- Google “NuSMV model checker”.
- Go to web-site ([nusmv.fbk.eu](http://nusmv.fbk.eu))
- Download binaries

## 2 Read documentation

## 3 Solve problem

## Hint #1

The “missionary safety property” is **not** just

```
c_onleft <= m_onleft & c_onright <= m_onright
```

## Hint #2

Use as few variables (defined in VAR block) as possible.

For example:

```
MODULE main
```

```
VAR
```

```
  m_onleft : 0 .. 3;
```

```
  c_onleft : 0 .. 3;
```

```
  boatonleft : boolean ;
```

```
DEFINE
```

```
  m_onright := 3 - m_onleft;
```

```
  c_onright := 3 - c_onleft;
```