# Assignment 2

Ruofei HUANG(z5141448)  Anqi ZHU(z5141541)

April 21, 2018

## 1 Task 1

main function (sth here)

$$\textbf{proc } EMIRP(\textbf{value } n : \mathbb{N}, \textbf{result } r : \mathbb{N})\cdot\cdot$$
$$\llcorner n, r : \left[ \begin{array}{l} n > 0, \\ \sum_{i=1}^{r} emirp(i) = n \wedge \sum_{i=1}^{r-1} emirp(i) = n - 1 \end{array} \right] \lrcorner^{(1)}$$

where (sth here)

$$emirpVal(i) = \begin{cases} 1 & \text{if } isPrime(r) \wedge isPrime(reverse(r)) \wedge r \neq reverse(r) \\ 0 & \text{else} \end{cases}$$

## 2 Task 2

$$\begin{array}{ll} (1) \sqsubseteq & \langle \textbf{c-frame} \rangle \\ & r : \left[ \begin{array}{l} n > 0, \\ \sum_{i=1}^{r} emirp(i) = n \wedge \sum_{i=1}^{r-1} emirp(i) = n - 1 \end{array} \right] \\ \sqsubseteq & \langle \textbf{i-loc} \rangle \\ & \llcorner \textbf{var} j : r, j : \left[ \begin{array}{l} n > 0, \\ \sum_{i=1}^{r} emirp(i) = n \wedge \sum_{i=1}^{r-1} emirp(i) = n - 1 \end{array} \right] \lrcorner^{(2)} \end{array}$$

We contruct the loop to verify the prime

$$
\begin{array}{l}
(2) \sqsubseteq \quad \langle \textbf{c-frame} \rangle \\
\quad \llcorner \textbf{var} j : r, j : \left[ \begin{array}{l} n > 0, \\ Inv \end{array} \right] \lrcorner_{(3)}; \\
\quad \llcorner \textbf{var} j : r, j : \left[ \begin{array}{l} Inv, \\ \sum_{i=1}^{r} emirp(i) = n \wedge \sum_{i=1}^{r-1} emirp(i) = n - 1 \end{array} \right] \lrcorner_{(4)};
\end{array}
$$

where the loop invariant is defined by

$$
Inv = \left( \begin{array}{c} \in \\ \sum_{i=1}^{j} emirp(i) = n \wedge \sum_{i=1}^{j-1} emirp(i) = n - 1 \wedge \end{array} \right)
$$