ISIS-1106-1 Lenguajes y Máquinas
Quiz Taller 4
Fecha: Noviembre 8 de 2024

Individual Assignment

Use GOLD to implement a pushdown automaton that recognizes strings that represent instances of the division algorithm
The language is described below:
The alphabet is:

$$\{2,0,3,4,5,\mathtt{x},\mathtt{q},\mathtt{r},=,+,*\}$$

Let n be a positive integer and $d \in \{2,3,4,5\}$.
Valid strings are of the form:

$$\begin{cases} \mathtt{x}^n{=}d{*}\mathtt{q}^{n\div d}+\mathtt{r}^{n\ \%\ d} & if\ \ n\div d>0\wedge n\ \%\ d>0 \\ \mathtt{x}^n{=}d{*}\mathtt{q}^{n\div d} & if\ \ n\div d>0\wedge n\ \%\ d=0 \\ \mathtt{x}^n{=}d{*}0+\mathtt{r}^{n\ \%\ d} & if\ \ n\div d=0\wedge n\ \%\ d>0 \end{cases}$$

The case: $n\div d=0\wedge n\ \%\ d=0$ is imposible because n would be zero.

Examples of valid strings:

- $\mathtt{xxxxxx}=2{*}\mathtt{qqq}$
- $\mathtt{xxxxxx}=3{*}\mathtt{qq}$
- $\mathtt{xxxxxx}=5{*}\mathtt{q}+\mathtt{r}$
- $\mathtt{xx}=5{*}0+\mathtt{rr}$
- $\mathtt{xxxxxxxxxxxx}=5{*}\mathtt{qq}+\mathtt{rr}$
- $\mathtt{xxxxxxxxxxxxxx}=4{*}\mathtt{qqq}+\mathtt{rrr}$

Examples of strings not in the language:

- $\mathtt{xxxxxx}=2{*}\mathtt{qq}+\mathtt{rr}$
- $\mathtt{xxxxxx}=3{*}+\mathtt{rrrrrr}$

Note that the number of $\mathtt{r}$'s has to be less than d