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Precise modelling and analysis
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INF [9/5]906: static analysis

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Handout 1: Intro

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The abstract grammar of the While language looks as follows:

a	$::=$	$x \mid n \mid a\ \mathtt{op}_a\ a$	arithm. expressions
b	$::=$	$\mathsf{true} \mid \mathsf{false} \mid \mathsf{not}\ b \mid b\ \mathtt{op}_b\ b \mid a\ \mathtt{op}_r\ a$	boolean expr.
S	$::=$	$[x := a]^l \mid [\mathsf{skip}]^l \mid S_1; S_2$	statements
		$\mathtt{if}[b]^l\ \mathtt{then}\ S\ \mathtt{else}\ S \mid \mathtt{while}[b]^l\ \mathtt{do}\ S$	

Example 1 (Factorial) The following is the code of the factorial "function" (in labelled, abstract syntax of the imperative While language). The corresponding flow graph is given in Figure 1.

$$[y := x]^1; [z := 1]^2; \mathtt{while}[y > 1]^3\ \mathtt{do}([z := z * y]^4; [y := y - 1]^5); [y := 0]^6 \qquad (1)$$

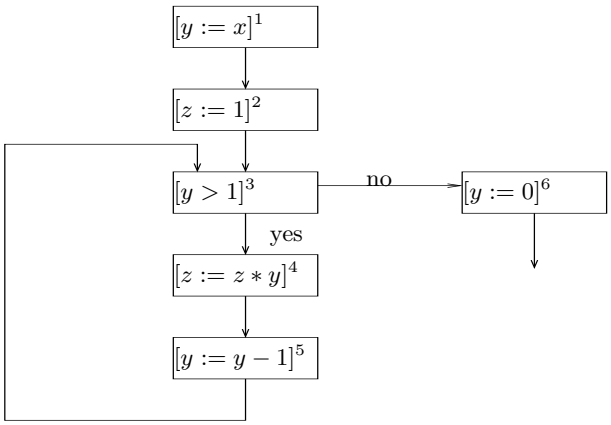

Figure 1: Flow graph

References

[1] Flemming Nielson, Hanne-Riis Nielson, and Chris L. Hankin. *Principles of Program Analysis*. Springer-Verlag, 1999.