

BU CAS CS 520 (FALL SEMESTER, 2003)
PRINCIPLES OF PROGRAMMING LANGUAGES

Assignment 7

Out: Wednesday, 03 December 2003

Due: Friday, 12 December 2003

Total: 120 points

Exercise 1 (40 points) Let *UFPL* be the untyped functional programming language obtained from erasing types in *TFPL*. We extend *UFPL* with the following language constructs:

<i>expressions</i>	$e ::= \dots * E \mid \mathbf{callcc}(e) \mid \mathbf{throw}(e_1, e_2)$
<i>values</i>	$v ::= \dots \mid *E$
<i>evaluation contexts</i>	$E ::= \dots \mid \mathbf{callcc}(E) \mid \mathbf{throw}(E, e)$

The evaluation rules for these language constructs are given below:

$$\begin{aligned} E[\mathbf{callcc}(v)] &\rightarrow E[v(*E)] \\ E[\mathbf{throw}(*E', e)] &\rightarrow E'[e] \end{aligned}$$

Please implement a function *wrap-fun-cont* which takes a function *f* and an evaluation context **E* and then returns the evaluation context **E[f(())]*. In other words, we have

$$E_0[\mathbf{wrap-fun-cont}(f)(*E)] \rightarrow^* E_0[*E[f(())]]$$

for any *E*₀.

Exercise 2 (80 points) Please implement an evaluator for the functional programming language *TFPL* by following the dynamic semantics defined via the use of evaluation contexts.