1 Change Log

1.0 Initial release.

1.1 Change mistake in No.6 point.

2 Solutions

1. (15 pts + 3 pts Extra Credit) Below is a fragment of OCaml code, with various program points indicated by numbers with comments.

(code and solution on next page)

For each of program points 1, 2, 3, 4, 5, 6, and 7 please describe the environment in effect after evaluation has reached that point. Program points 8 and 9 are extra credits. You may assume that the evaluation begins in an empty environment, and that the environment is cumulative thereafter. The program points are supposed to indicate points at which all complete preceding declarations (including local ones) have been fully evaluated. You may name your environments and closures, and use their name in describing other environments, but all applications of the update operator (+) should be expanded out.
let a = 10;;
let x = 11 + a;;
(* 2 *)
let f x y = x - y + a;;
let b = (f x a) in
  (let a = 5 in
    a + b + x );;
(* 4 *)
let x = 1;;
(* 6 *)
let h y = (let x = 2 in
    (let y = 20 in
      f x y ) );;
(* 7 *)
(* extra credit *)
let h y = f (y+4) in
  (let a = 1 in
    (h 10) (f a a) ) );;
(* 9 *)