Symbol Table: Name Type Memory Location x int 2000 a int 2001

Instruction Table: Address Op Operand 1 PUSHI 0 2 PUSHM 2000 3 PUSHI 0 4 PUSHM 2001 5 PUSHM 2001 6 POPM 2001

! Rat18S sample code less than 10 lines !

%%

int x;

boolean a;

a = false;

Symbol Table: Name Type Memory Location x int 2000 y int 2001 z int 2002 foo$ int 2003 bar$ int 2004

Instruction Table: Address Op Operand 1 PUSHI 0 2 PUSHM 2000 3 PUSHI 0 4 PUSHM 2001 5 PUSHI 0 6 PUSHM 2002 7 PUSHI 0 8 PUSHM 2003 9 PUSHI 0 10 PUSHM 2004 11 PUSHM 2003 12 PUSHI 35 13 POPM 2003 14 PUSHM 2004 15 PUSHI 30 16 POPM 2004 17 PUSHM 2003 18 LES nil 19 JUMPZ 23 20 PUSHM 2004 21 PUSHM 2000 22 PUSHI 5 23 POPM 2000 24 PUSHM 2004 25 PUSHI 12 26 POPM 2004

! Rat18S sample code less than 20 lines !

%%

int x; int y; int z;

int foo; $intbar$;

foo$ = 35; bar$ = 30;

if (foo$ <= bar$) x = 5; endif

bar$ = 12;

Symbol Table: Name Type Memory Location num int 2000 foo int 2001 bar$ int 2002

Instruction Table: Address Op Operand 1 PUSHI 0 2 PUSHM 2000 3 PUSHI 0 4 PUSHM 2001 5 PUSHI 0 6 PUSHM 2002 7 PUSHM 2000 8 STDIN nil 9 PUSHM 2001 10 STDIN nil 11 PUSHM 2002 12 STDIN nil 13 LABEL nil 14 PUSHM 2000 15 LES nil 16 JUMPZ 25 17 PUSHM 2001 18 PUSHM 2000 19 STDOUT nil 20 PUSHM 2000 21 PUSHM 2000 22 PUSHM 2002 23 ADD nil 24 POPM 2002 25 JUMP nil 26 PUSHM 2002 27 STDOUT nil

! Sample code more than 20 lines !

%%

int num; int foo; int bar$;

get (num); get (foo); get (bar$);

while (num < foo) { put (num); num = num + bar$; }

put(bar$);

Symbol Table: Name Type Memory Location i int 2000 max int 2001 sum int 2002

Instruction Table: Address Op Operand 1 PUSHI 0 2 PUSHM 2000 3 PUSHM 2001 4 PUSHM 2002 5 PUSHM 2002 6 PUSHI 0 7 POPM 2002 8 PUSHM 2000 9 PUSHI 1 10 POPM 2000 11 PUSHM 2001 12 STDIN nil 13 LABEL nil 14 PUSHM 2000 15 LES nil 16 JUMPZ 28 17 PUSHM 2001 18 PUSHM 2002 19 PUSHM 2002 20 PUSHM 2000 21 ADD nil 22 POPM 2000 23 PUSHM 2000 24 PUSHM 2000 25 PUSHI 1 26 ADD nil 27 POPM 2000 28 JUMP nil 29 PUSHM 2002 30 PUSHM 2001 31 ADD nil 32 STDOUT nil

! Calculate the sum up to a given integer ! %% int i, max, sum;

sum = 0; i = 1; get (max); while (i < max) { sum = sum + i; i = i + 1; } put (sum + max);

DEBUG: Backtracking from 28 (i) to 27 (if) DEBUG: Backtracking from 28 (i) to 27 (if) Symbol Table: Name Type Memory Location i int 2000 j int 2001 sum int 2002 max int 2003

Instruction Table: Address Op Operand 1 PUSHI 0 2 PUSHM 2000 3 PUSHM 2001 4 PUSHM 2002 5 PUSHM 2003 6 PUSHM 2000 7 PUSHI 1 8 POPM 2000 9 PUSHM 2001 10 PUSHI 2 11 POPM 2001 12 PUSHM 2002 13 PUSHI 0 14 POPM 2002 15 PUSHM 2003 16 PUSHI 5 17 POPM 2003

%% int i, j, sum, max;

i = 1;

j = 2;

sum =0;

max = 5;

if(i < max){ sum = i +j; i= i + 1; }

put(sum)