

t1ab)

digit = "0" | "1" | ... | "8" | "9" ;

letter = "A" | "B" | ... | "Y" | "Z";

identifier = letter , { letter | digit | "\_" } ;

number = digit , { digit } ;

truth = "true" | "false" | "not", truth | identifier, "is", expr ;

expr = expr, ("+" | "-"), term | term ;

term = term, ( "\*" | "/" ), factor | factor ;

factor = "( ", expr, ")" | truth | identifier | number | postfix ;

stmt = if | while | set | print ;

if = "if", ( expr | logicalor ), "then", scope, "else", scope ;

while = "while", expr, scope ;

set = "set", identifier, "=", ( expr | ternary | logicalor ), ";" ;

print = "print", expr, ";" ;

decl = variable

variable = "var", identifier, [ "=", expr ], ";" ;

stmts = { stmt } ;

decls = { decl } ;

scope = "{", { decls | stmts }, "}" ;

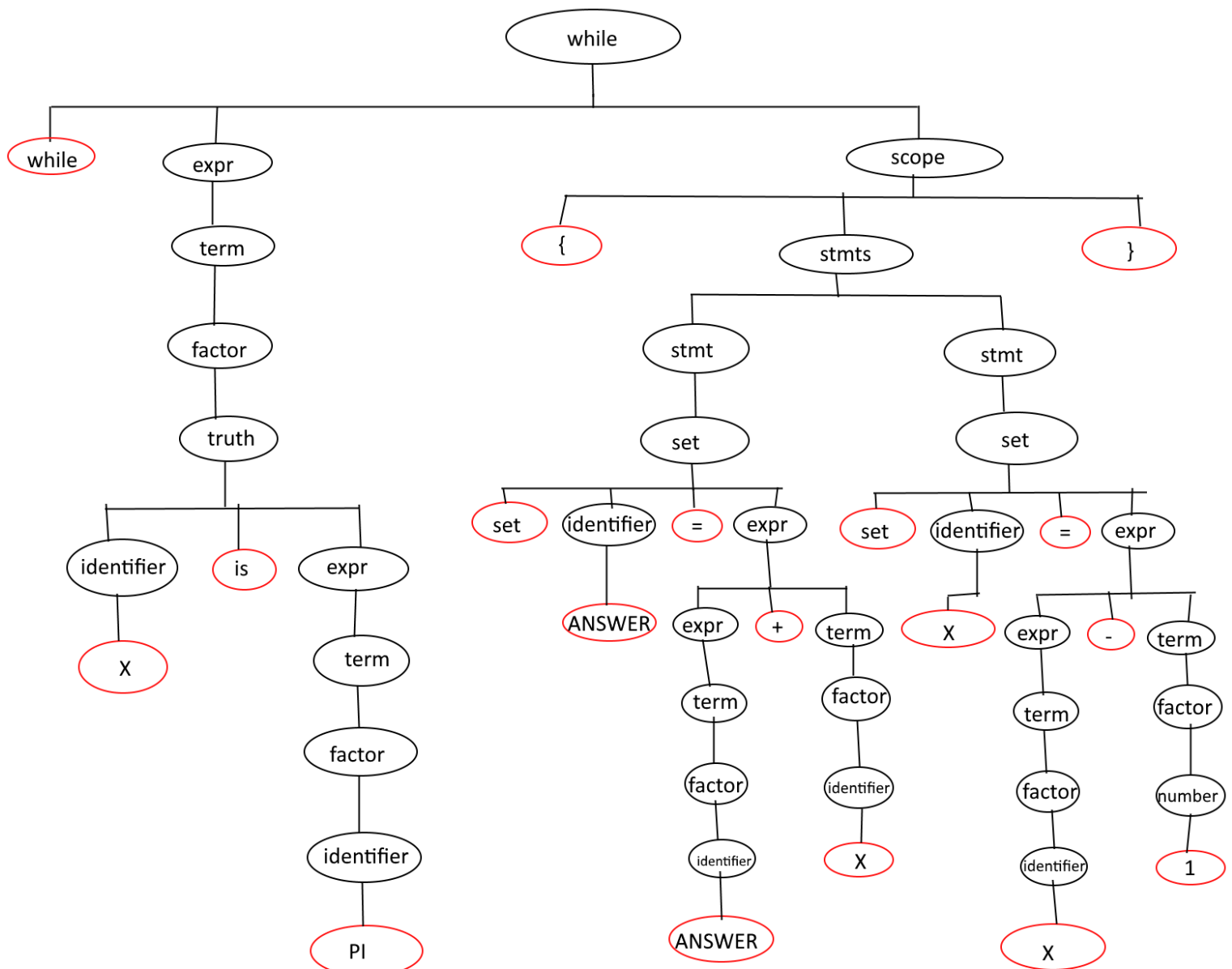
init = "begin", "program", identifier ;  
program = init, [ decls ], stmts, "end." ;

ternary = truth, "?", expr, ":", expr ;

postfix = ( expr, identifier ) , "++"

logicalor = truth, "||", truth ;

t2)



t3)

a)

16-tavun muisti

| osoite | data |
|--------|------|
| 0      | 5    |
| 1      | 1    |
| 2      | 4    |
| 3      | 5    |
| 4      | 3    |
| 5      | 20   |
| 6      | 2    |
| 7      | 60   |
| 8      | 1    |
| 9      | 120  |
| 10     |      |
| 11     |      |
| 12     |      |
| 13     |      |
| 14     |      |
| 15     |      |

← pino-osoitin

b)

```
int kertoma(int n) {  
    if (n<0) return 0;  
    if (n==0) return 1;  
    if (n==1) return n;  
    return n*kertoma(n-1);  
}
```

| osoite | data |
|--------|------|
| 0      | 5    |
| 1      | 4    |
| 2      | 3    |
| 3      | 2    |
| 4      | 1    |
| 5      | 120  |
| 6      |      |
| 7      |      |
| 8      |      |
| 9      |      |
| 10     |      |
| 11     |      |
| 12     |      |
| 13     |      |
| 14     |      |
| 15     |      |

← pino-osoitin

Alunperin ohjelma saattoi viedä 9 muistipaikkaa. Muokattu versio vie 5 paikkaa.