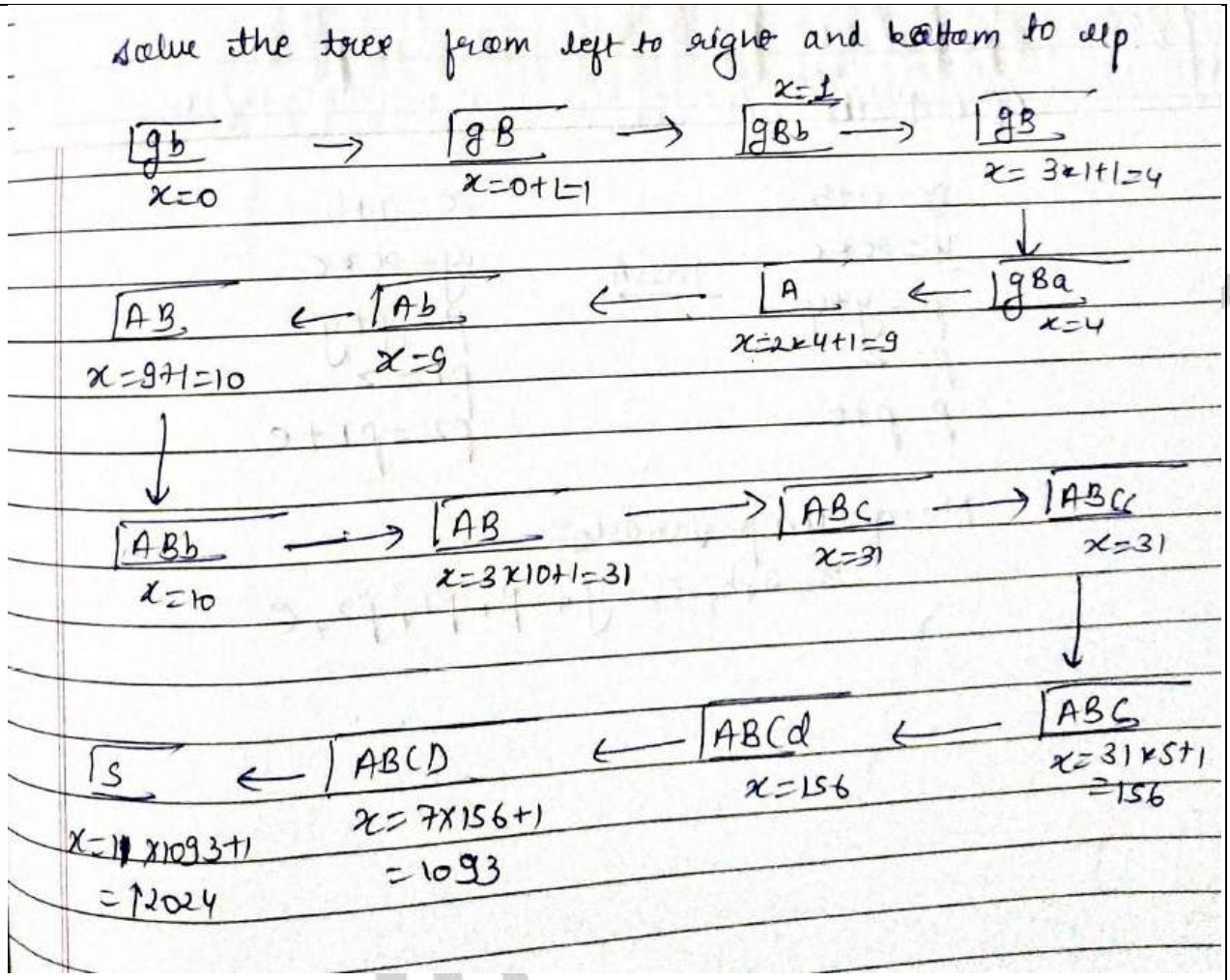


Q130. What from the following statements concerning the intermediate representations (IR) is incorrect?

(A) IR simplify retargeting to a new host.

(B) IR simplify writing of a compiler for another language to the same host.

(C) Properly fixed IR simplify semantic aspects of the source language.

(D) IR break the compiler into manageable pieces

Answer :-D

IR break the compiler into manageable pieces .false

Q131. Which of the following is not a typical intermediate representation**?**

(A) Three address code

(B) Directed acyclic graphs

(C)Abstract syntax trees

(D)Annotated parse trees

131) Answer D
3-address code
DAG
Abstract syntax tree
all are forms of intermediate representation

Q132. Consider the following code segment.

```
x = a + b;
y = x * c;
p = y + y;
p = p + d;
p = p - d;
p = p + e;
```

The minimum number of total variables required to convert the above code segment to static single assignment form is_____

132) Answer 9

x = a+b
y = x*c
p = y+y
p = z+d
p = z-d
p = p+e

These both equation ultimately results in p=z

x = a+b
y = x*c
p = y+y
p = z
p = p+e

SSA →

x = a+b
y = x*c
p = y+y
p1 = z
p2 = p1+e

No. of temp variables
x, a, b, c, y, p, p1, p2, e

Q133. Consider the following code segment.

```
a:= b + c
b:= c + d
d:= b + c
a:= a + c
e:= a + b
```

The minimum number of total variables required to convert the above code segment to static single assignment form is _____.

133) Answer 6

$a = b + c$

$b = c + d$

$d = b + c$

$a_1 = a + c$

$e = a_1 + b$

Thus minimum no. of total variables

a, b, c, d, e, a_1

6

Q134. The least number of temporary variables required to create a three-address code in static single assignment form for the expression a = b *d – c + b *e – c is_____

134) Answer 4

$a = b * d - c + b * e - c$

$t_1 = b * d$

$t_2 = b * e$

$t_3 = t_1 - c$

$t_4 = t_3 + t_2$

$a = t_4 - c$

4 temporary variables are required.

Q135. Consider the following code

```
a = 10;
b =20;
if (a > b) {
c = 30;
e = c - b;
} else {
d = b;
e = a + d;
```

Determine the minimum number of registers needed to execute above code without spilling? _____.

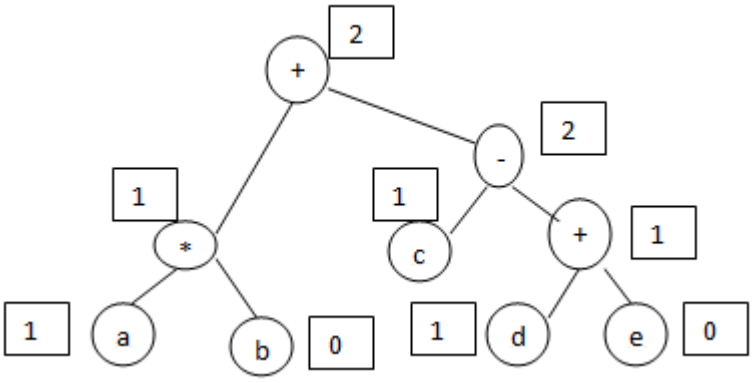
135) Answer 2

a = 10
b = 20
if (a ≤ b) goto L1
c = 30
e = c - b
L1: d = b
e1 = a + d
t1 = ϕ (e1, e)

At one time only 2 registers are required without spilling.

Q136. What is the minimal number of registers necessary for the generation of code corresponding with the following expression if one operand can be a memory location. (a * b) + (c - (d + e))

Answer: 2
Solution:



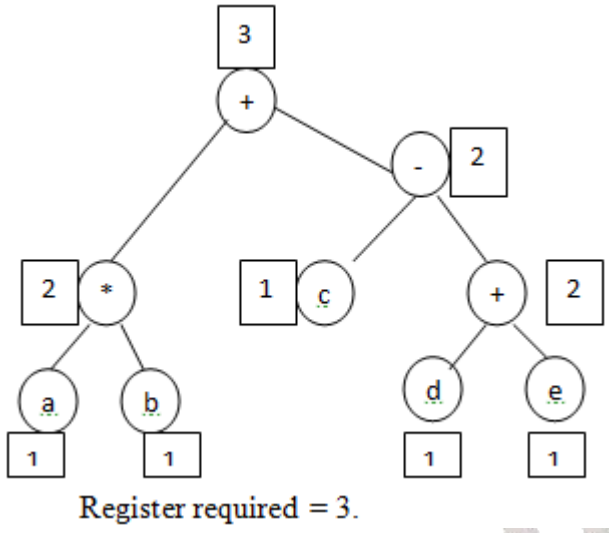
Q137. What is the minimal number of registers necessary for the generation of code corresponding with the following expression if all operands in cpu register?

(a * b) + (c - (d + e))

(A)2 (B)3 (C)4 (D)5

Answer: B

Solution:



Register required = 3.

Q138. Consider the following code

```
a = 1 ;
b = 10;
c = 20;
d = a + b;
e = c + d;
f = c + e;
b = c + e;
e = b + f;
d = 5 + e;
return d+f;
```

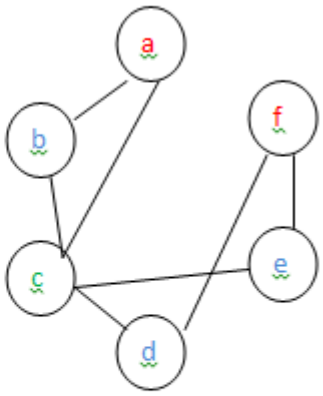
What is the fewest number of registers that is needed for this program, without spilling? _____

Answer: 3

a = 1 ;
b = 10;
c = 20;
d = a + b;
e = c + d;
f = c + e;
b = c + e;
e = b + f;
d = 5 + e;
return d+f;
	a = 1 ;
	b = 10;
	c = 20;
	d = a + b;
	e = c + d;
	f = c + e;
	e = 2*f
	d = 5 + e;
	return d+f;

We can reduce the expression b=c+e
And replace e=b+f to e=2*f

a = 1 ;
a
b = 10;
a,b
c = 20;
a,b,c
d = a + b;
c,d
e = c + d;
c,e
f = c + e;
e,f
e = 2*f
e,f
d = 5 + e;
d,f
return d+f;



3 colors are required thus register required will be 3

For next three questions consider the following three address code: