6.3.1：确定下列声明序列中各个标识符的类型和相对地址

```
float x;
record { float x; float y } p;
record { int tag; float x; float y } q;
```

解：SDT

P → { top = new Env(); offset = 0; }

D

D → T id; { top.put(id.lexeme, T.type, offset);
offset += T.width }

D1

D → ε

T → int { T.type = integer; T.width = 4; }

T → float { T.type = float; T.width = 8; }

T → record '{' { Env.push(top), top = new Env();
Stack.push(offset), offset = 0; }

D '}' { T.type = record(top); T.width = offset;
top = Env.top(); offset = Stack.pop(); }

line	id	type	offset	Env
1	x	float	0	1
2	x	float	0	2
2	y	float	8	2
2	p	record	8	1

3	tag	int	0	3
3	b	float	4	3
3	y	float	12	3
3	q	record( )	24	1

6.4.3：使用图6-22的翻译方案翻译下列赋值语句

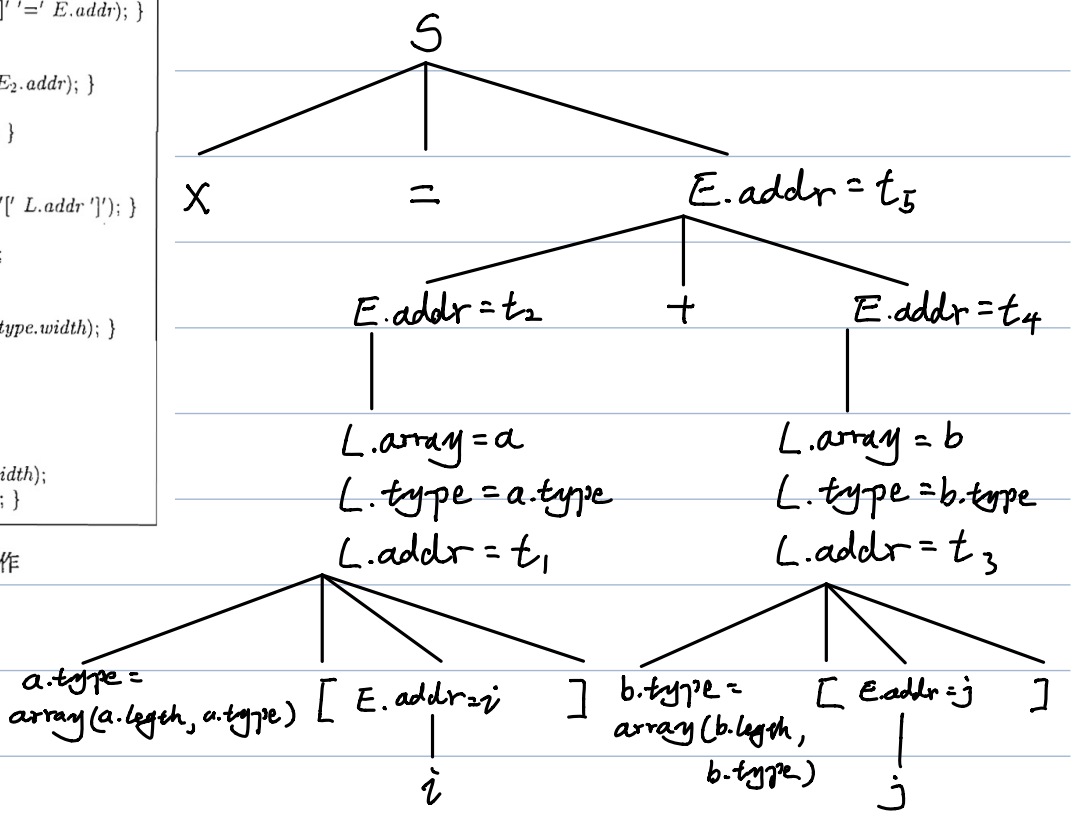
1) x = a[i] + b[j]

2) x = a[i][j] + b[i][j]

$S \rightarrow$	id = E ;	{ *gen*(*top.get*(id.*lexeme*) '=' E.*addr*); }
|	L = E ;	{ *gen*(L.*array* .*base* '[' L.*addr* ']' '=' E.*addr*); }
$E \rightarrow$	E_1 + E_2	{ E.*addr* = **new** *Temp*(); *gen*(E.*addr* '=' E_1.*addr* '+' E_2.*addr*); }
|	id	{ E.*addr* = *top.get*(id.*lexeme*); }
|	L	{ E.*addr* = **new** *Temp*(); *gen*(E.*addr* '=' L.*array*.*base* '[' L.*addr* ']'); }
$L \rightarrow$	id [E]	{ L.*array* = *top.get*(id.*lexeme*); L.*type* = L.*array*.*type*.*elem*; L.*addr* = **new** *Temp*(); *gen*(L.*addr* '=' E.*addr* '*' L.*type*.*width*); }
|	L_1 [E]	{ L.*array* = L_1.*array*; L.*type* = L_1.*type*.*elem*; t = **new** *Temp*(); L.*addr* = **new** *Temp*(); *gen*(t '=' E.*addr* '*' L.*type*.*width*); *gen*(L.*addr* '=' L_1.*addr* '+' t); }

图 6-22　处理数组引用的语义动作

1) X = a[i] + b[j]



$t_1 = i * a.w$

$t_2 = a[t_1]$

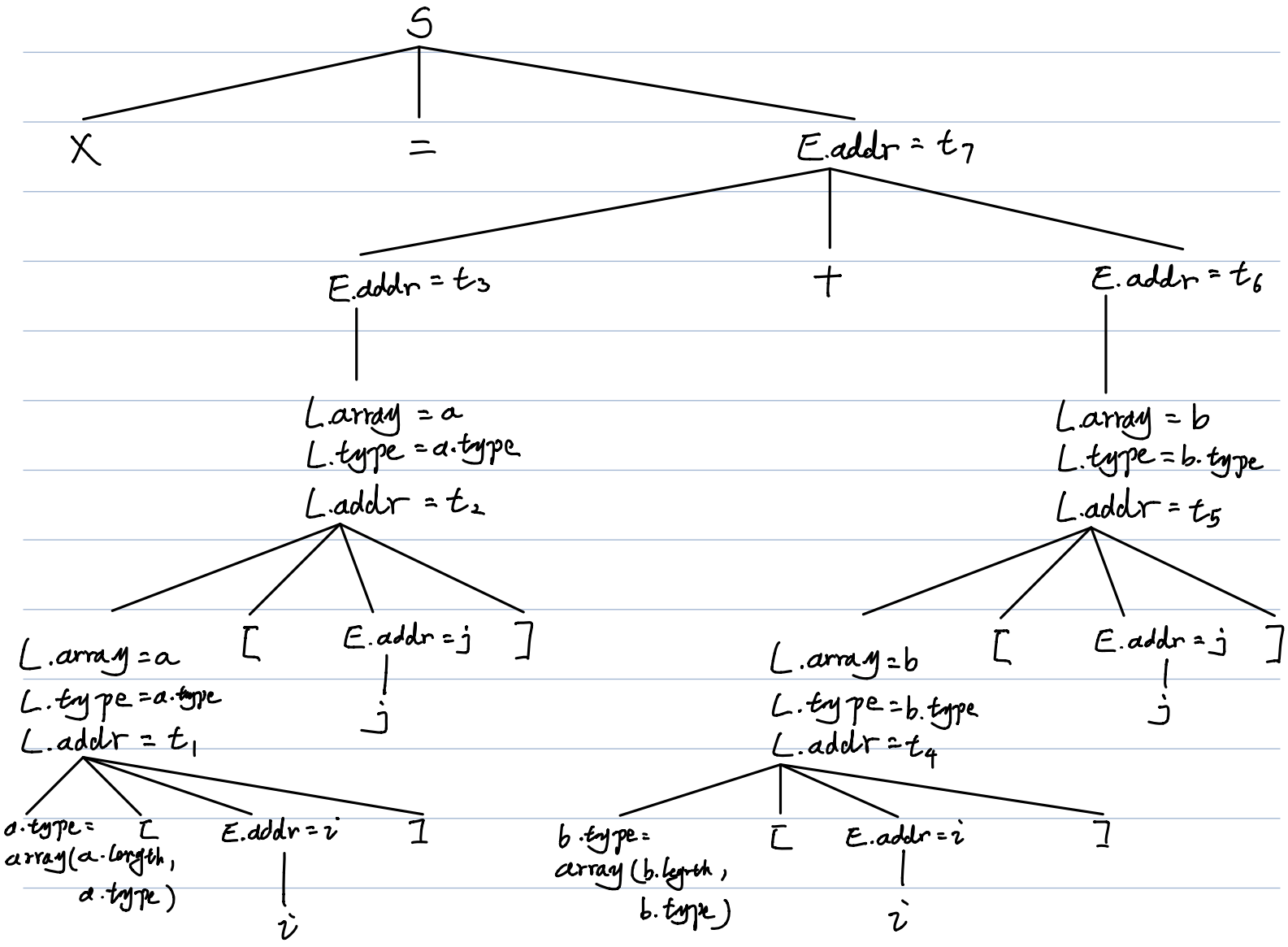
$t_3 = j * b.w$

$t_4 = b[t_3]$

$t_5 = t_2 + t_4$

$x = t_5$

2) X = a[i][j] + b[i][j]



$t_1 = i \cdot n_1$

$t_2 = t_1 + j$

$t_3 = a[t_2]$

$t_4 = i \cdot m_1$

$t_5 = t_4 + j$

$t_6 = b[t_5]$

$t_7 = t_3 + t_6$

$X = t_7$

6.5.1：假定图6-26中的函数widen可以处理图6-26a的层次结构中的所有类型，翻译下列表达式。假定c和d是字符型，s和t是短整型，i和j是整型，x是浮点型

1) x = s + c
2) i = s + c
3) x = (s + c) * (t + d)

解：1) $X = s + c$ ：

$t_1 = (short)\, c$

$t_2 = s + t_1$

$t_3 = (float)\, t_2$

$X = t_3$

2) $i = s + c$ ：

$X = s + c$

$t_1 = (short)\, c$

$t_2 = s + t_1$

$t_3 = (int)\, t_2$

$i = t_3$

3) $X = (s+c) * (t+d)$ ：

$t_1 = (short)\, c$

$t_2 = s + t_1$

$t_3 = (short)\, d$

$t_4 = t + t_3$

$t_5 = (float)\, t_2$

$t_6 = (float)\, t_4$

$X = t_5 + t_6$