Homework 9 — May 12

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9.1

1. 翻译得到的结果如下：

```
1    t1 = (int)s
2    t2 = (int)d
3    t3 = t1 + t2
4    x = (float)t3
```

2. 翻译得到的结果如下：

```
1    t1 = (int)s
2    t2 = (int)d
3    t3 = t1 + t2
4    t4 = (float)t3
5    t5 = (float)t
6    t6 = t5 + x
7    x = t4 * t6
```

9.2

1. 添加以下语义规则：

$$S_1.next = newlabel()$$
$$B.true = S.next$$
$$B.false = newlabel()$$
$$S.code = label(B.false)\|S_1.code\|label(S_1.next)\|B.code$$

2. 添加以下语义规则：

$$S_1.next = newlabel()$$
$$B.true = newlabel()$$
$$B.false = S.next$$

$$S_2.next = S_1.next$$

$$S_3.next = newlabel()$$

$$S.code = S_1.code\|label(S_1.next)\|B.code\|label(B.true)$$

$$\| \ S_3.code\|label(S_3.next)\|S_2.code\|gen('goto', S_1.next)$$

9.3

1. 翻译过程如下：

子表达式	$truelist$	$falselist$	翻译结果
$E_1 = a == b$	$\{100\}$	$\{101\}$	100: `if a==b goto _` 101: `goto _`
$E_2 = c == d$	$\{102\}$	$\{103\}$	102: `if c==d goto _` 103: `goto _`
$E_3 = e == f$	$\{104\}$	$\{105\}$	104: `if e==f goto _` 105: `goto _`
$E_4 = E_2\|E_3$	$E_2.t \cup E_3.t = \{102, 104\}$	$E_3.f = \{105\}$	回填 104 至 103
$E = E_1 \& \& E_4$	$E_4.t = \{102, 104\}$	$E_1.f \cup E_4.f = \{101, 105\}$	回填 102 至 100

最终翻译结果为：

```
1   100: if a==b goto 102
2   101: goto _
3   102: if c==d goto _
4   103: goto 104
5   104: if e==f goto _
6   105: goto _
```

2. 翻译过程如下：

子表达式	$truelist$	$falselist$	翻译结果
$E_1 = a == b$	$\{100\}$	$\{101\}$	100: `if a==b goto _` 101: `goto _`
$E_2 = c == d$	$\{102\}$	$\{103\}$	102: `if c==d goto _` 103: `goto _`
$E_3 = E_1\|E_2$	$E_1.t \cup E_2.t = \{100, 102\}$	$E_2.f = \{103\}$	回填 102 至 101
$E_4 = e == f$	$\{104\}$	$\{105\}$	104: `if e==f goto _` 105: `goto _`
$E = E_3\|E_4$	$E_3.t \cup E_4.t = \{100, 102, 104\}$	$E_4.f = \{105\}$	回填 104 至 103

最终翻译结果为：

```
1    100: if a==b goto _
2    101: goto 102
3    102: if c==d goto _
4    103: goto 104
5    104: if e==f goto _
6    105: goto _
```

3. 翻译过程如下：

子表达式	$truelist$	$falselist$	翻译结果
$E_1 = a == b$	$\{100\}$	$\{101\}$	100: `if a==b goto _` 101: `goto _`
$E_2 = c == d$	$\{102\}$	$\{103\}$	102: `if c==d goto _` 103: `goto _`
$E_3 = E_1 \&\& E_2$	$E_2.t = \{102\}$	$E_1.f \cup E_2.f = \{101, 103\}$	回填 102 至 100
$E_4 = e == f$	$\{104\}$	$\{105\}$	104: `if e==f goto _` 105: `goto _`
$E = E_3 \&\& E_4$	$E_4.t = \{104\}$	$E_3.f \cup E_4.f = \{103, 105\}$	回填 104 至 102

最终翻译结果为：

```
1    100: if a==b goto 102
2    101: goto _
3    102: if c==d goto 104
4    103: goto _
5    104: if e==f goto _
6    105: goto _
```