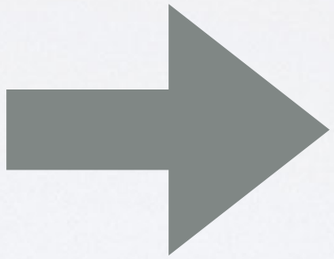
# 参考答案（0528）

- 1. 考虑下面的三地址中间代码，通过公共子表达式消除、归纳变量强度消减、归纳变量消除等方式尽可能地进行优化：

```
    r = 0
    i = 0
L: t1 = i * 8
    t2 = A[t1]
    t3 = i * 8
    t4 = B[t3]
    t5 = t2 * t4
    r = r + t5
    i = i + 1
    if i < n goto L
```

公共子表达式消除



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    r = 0
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L: t1 = i * 8
    t2 = A[t1]
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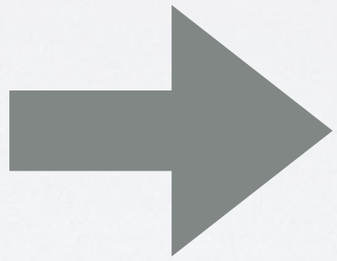
归纳变量强度消减



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    r = 0
    i = 0
    t1 = 0
L:  t2 = A[t1]
    t4 = B[t1]
    t5 = t2 * t4
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    i = i + 1
    t1 = t1 + 8
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    i = i + 1
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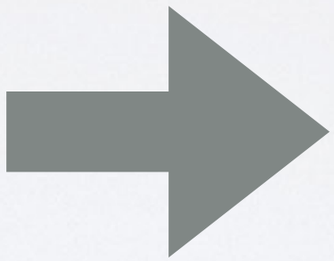
归纳变量消除



```
    r = 0
    t1 = 0
L:  t2 = A[t1]
    t4 = B[t1]
    t5 = t2 * t4
    r = r + t5
    t1 = t1 + 8
    t6 = n * 8
    if t1 < t6 goto L
```

# 参考答案（0528）

- 1. 考虑下面的三地址中间代码，通过公共子表达式消除、归纳变量强度消减、归纳变量消除等方式尽可能地进行优化：

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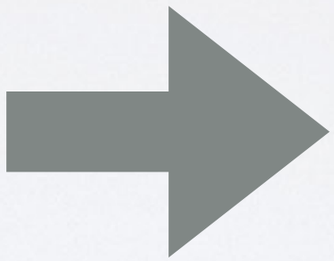
    t1 = t1 + 8
    t6 = n * 8
    if t1 < t6 goto L
```

不变式外提



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    r = 0
    t1 = 0
    t6 = n * 8
L:  t2 = A[t1]
    t4 = B[t1]
    t5 = t2 * t4
    r = r + t5
    t1 = t1 + 8
    if t1 < t6 goto L
```
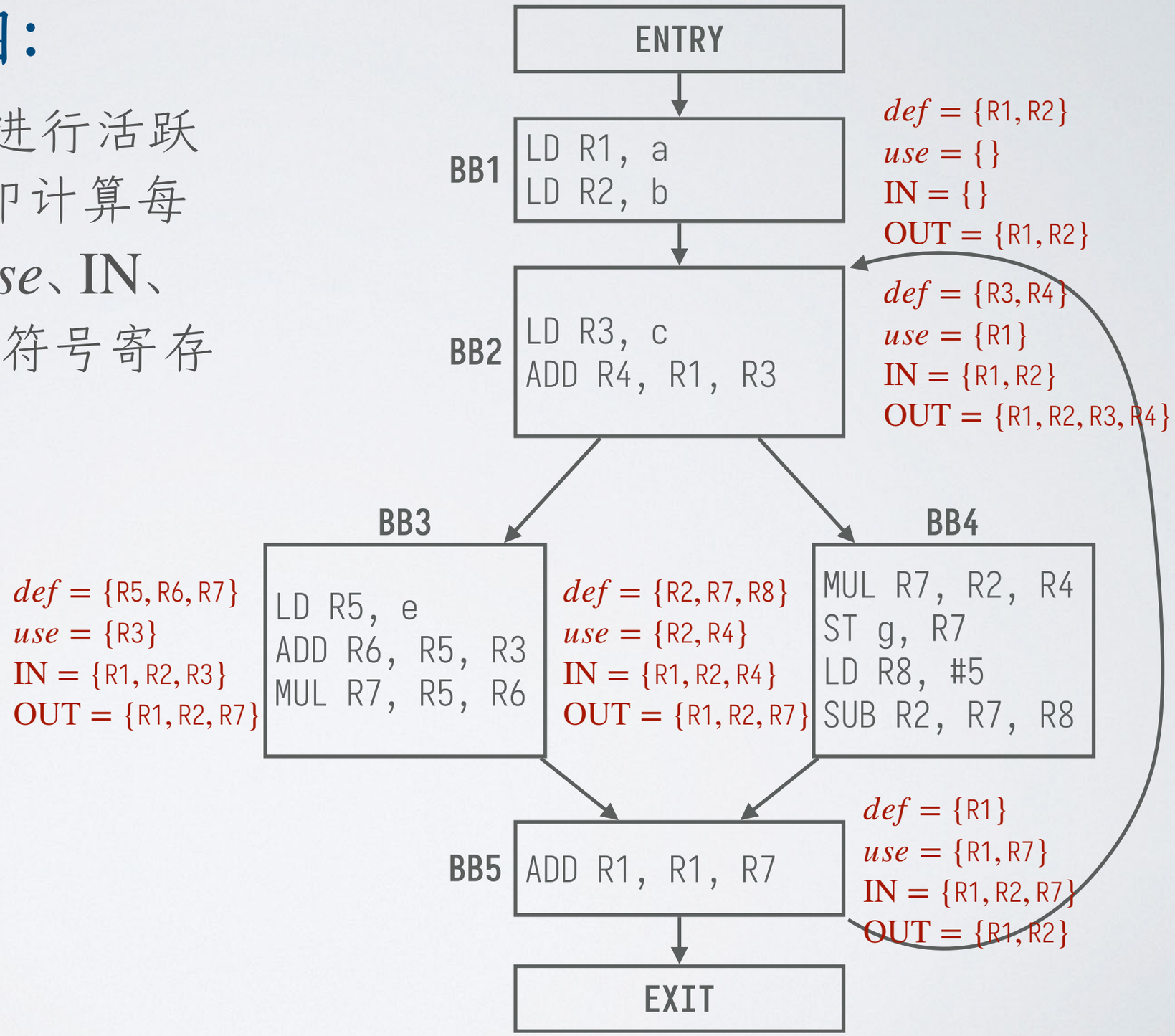
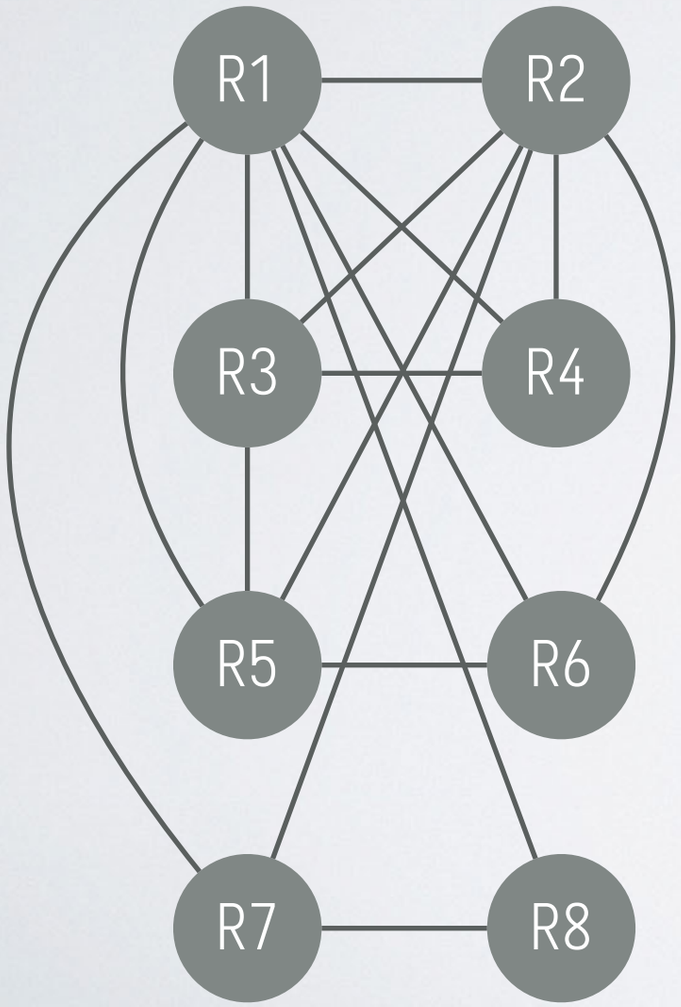

# 参考答案（0528）

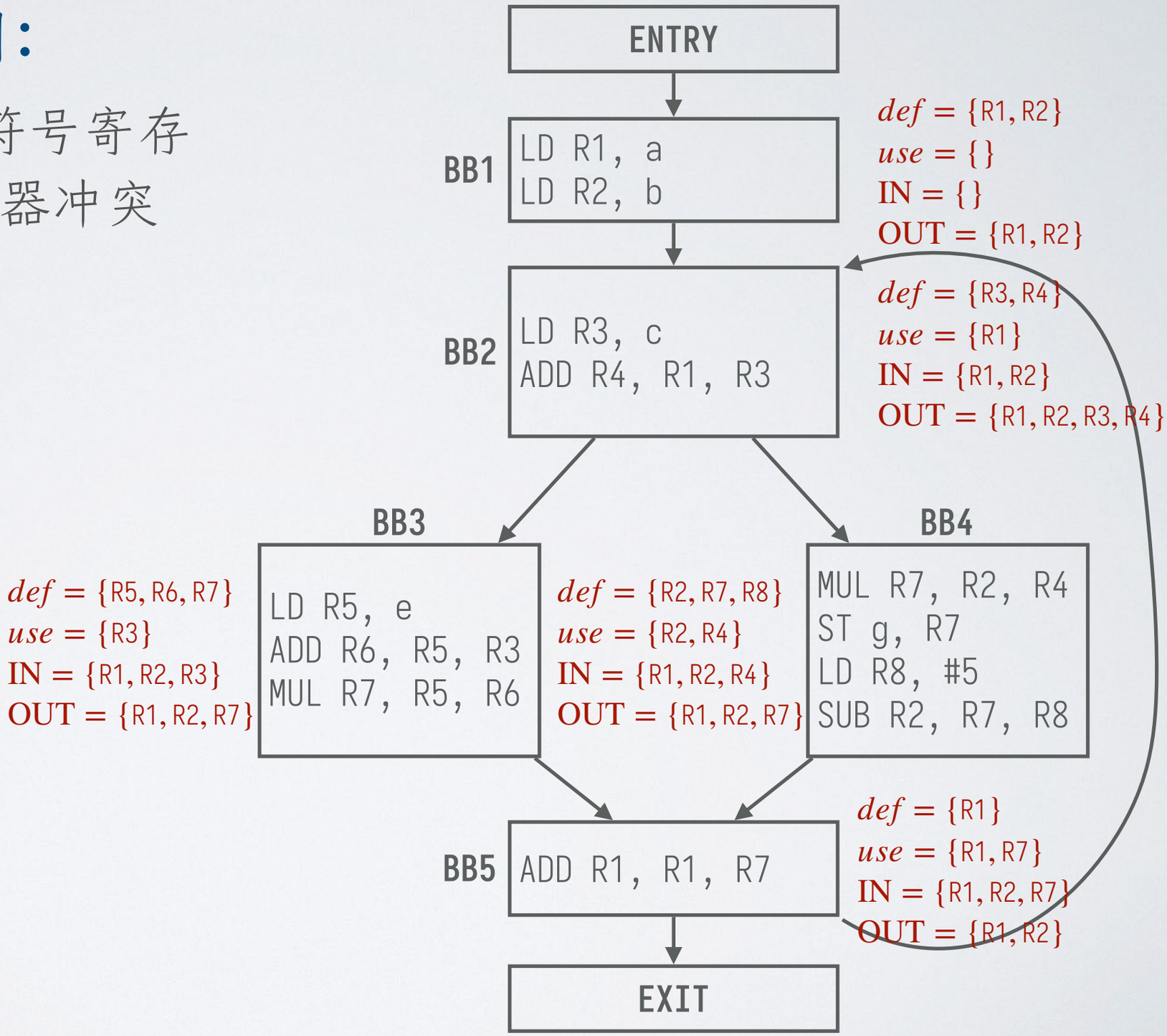
- **2. 考虑右边的流图：**
  - 基于数据流分析，进行活跃符号寄存器分析(即计算每个基本块的 *def*、*use*、IN、OUT，集合元素为符号寄存器 R1 ~ R8)



# 参考答案（0528）

- **2. 考虑右边的流图：**
  - 给出 R1 ~ R8 每个符号寄存器与哪些符号寄存器冲突



# 参考答案（0528）

- **2. 考虑右边的流图：**
  - 假设有 3 个物理寄存器，使用图着色法进行分配，给出溢出和分配的方案即可