(a)

```
main():
  foo(0, 100)
  foo(10000, 100000)

foo(k, N):
  while k < N:
    i = 0; j = k
    while i < j:
      i = i + 1; j = j - 1
    k = k + 1
```
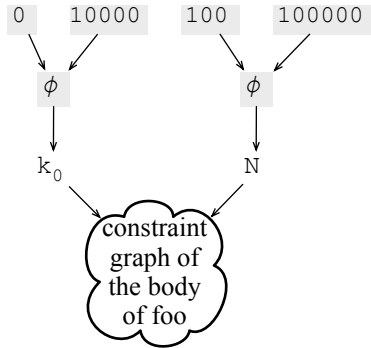
(b)


```
0   10000    100   100000
  ↓   ↓         ↓    ↓
   φ              φ
   ↓              ↓
  k₀              N
```

constraint graph of the body of foo

(c)

```
main():
  k_a = 0; N_a = 100
  while k_a < N_a:
    i_a = 0; j_a = k_a
    while i_a < j_a:
      i_a = i_a + 1; j_a = j_a - 1
    k_a = k_a + 1
  k_b = 10000; N_b = 100000
  while k_b < N_b:
    i_b = 0; j_b = k_b
    while i_b < j_b:
      i_b = i_b + 1; j_b = j_b - 1
    k_b = k_b + 1
```