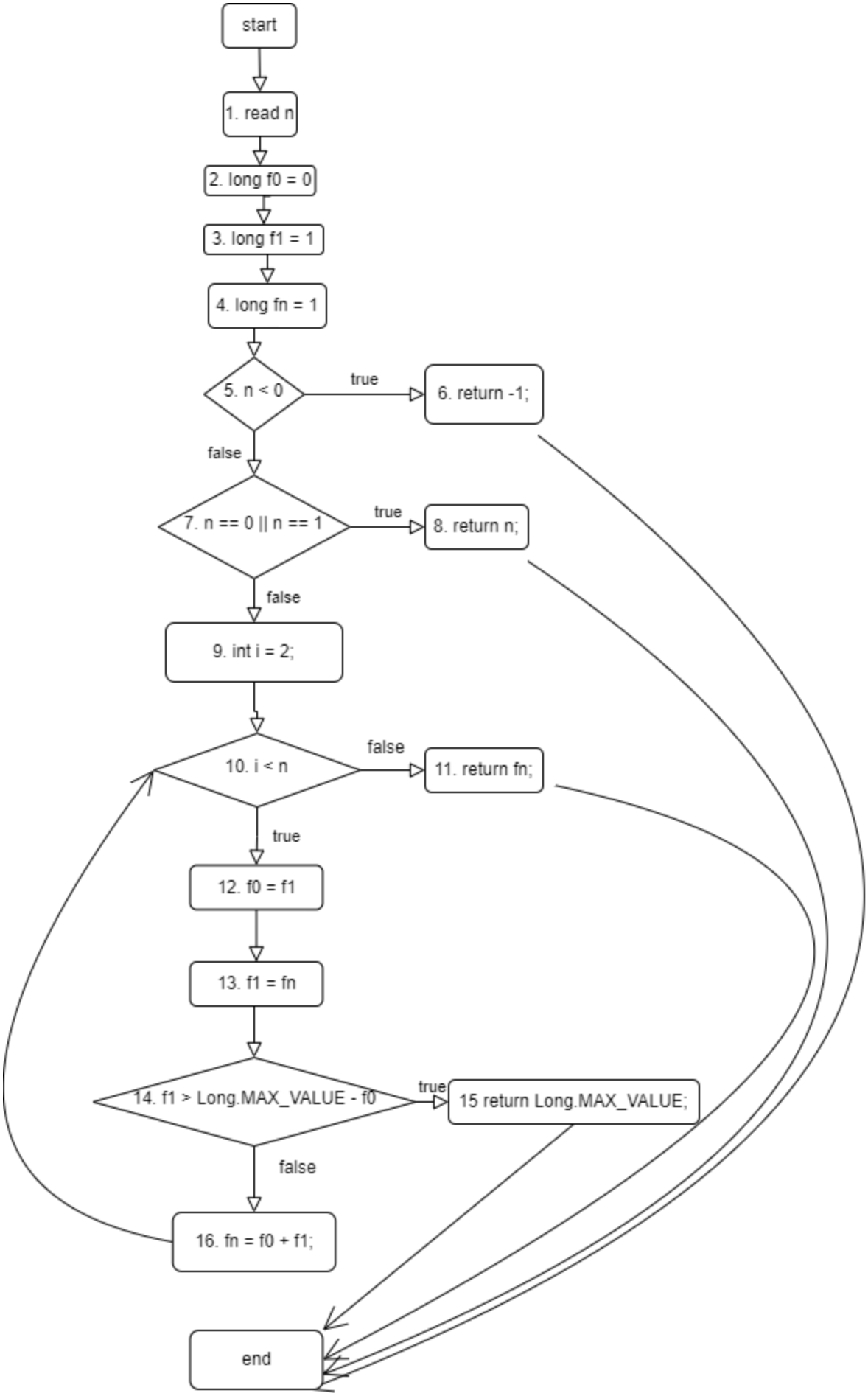
KIỂM THỬ DÒNG DỮ LIỆU
INT3117 40

Họ và tên: Phạm Văn Tiến
Mssv: 20021449

1. Sourse code: KiemThu/Code.java at main · Tienpv-02/KiemThu (github.com)

```java
public static long fibonacci(long n) {
  long f0 = 0;
  long f1 = 1;
  long fn = 1;
  if (n < 0) {
    return -1;
  } else if (n == 0 || n == 1) {
    return n;
  } else {
    for (int i = 2; i < n; i++) {
      f0 = f1;
      f1 = fn;
      if (f1 > Long.MAX_VALUE - f0) {
        return Long.MAX_VALUE;
      }
      fn = f0 + f1;
    }
  }
  return fn;
}
```

2. Đồ thị luồng dữ liệu DFG


start
1. read n
2. long f0 = 0
3. long f1 = 1
4. long fn = 1
5. n < 0
true
6. return -1;
false
7. n == 0 || n == 1
true
8. return n;
false
9. int i = 2;
10. i < n
false
11. return fn;
true
12. f0 = f1
13. f1 = fn
14. f1 > Long.MAX_VALUE - f0
true
15 return Long.MAX_VALUE;
false
16. fn = f0 + f1;
end

3. Xác định các đường đi

Var x : def(x) = {1} c-use(x) = { 8 } p-use(x) = {5, 7, 10}
f0: def(f0) = {2, 12} c-use(f0) = {16} p-use(f0) = {14}
f1: def(f1) = {3, 13} c-use(f1) = {12, 16} p-use(f1) = {14}
fn: def(fn) = {4; 16} c-use(fn) = {11, 13} p-use(fn) = {}

Var	Du-pair	Def-clear path	Complete path
n	(1,8)	1, 2, 3, 4, 5(F), 7(T), 8	1, 2, 3, 4, 5(F), 7(T), 8
f0	(12, 16)	12, 13, 14(F), 16	1, 2, 3, 4, 5(F), 7(F), 9, 10(T), 12, 13, 14(F), 16, 10(F), 11
f1	(3, 12)	3, 4, 5(F), 7(F), 9 ,10(T), 12	1, 2, 3, 4, 5(F), 7(F), 9, 10(T), 12, 13, 14(T), 15
	(13, 16)	13, 14(F), 16	1, 2, 3, 4, 5(F), 7(F), 9, 10(T), 12, 13, 14(F), 16, 10(F), 11
fn	(4, 11)	4, 5(F), 7(F), 9, 10(F), 11	1, 2, 3, 4, 5(F), 7(F), 9, 10(F), 11
	(4, 13)	4, 5(F), 7(F), 9, 10(T), 12, 13	1, 2, 3, 4, 5(F), 7(F), 9, 10(T), 12, 13, 14(T), 15

4. Sinh các ca kiểm thử

- **Biến n : n = 0**
- **Biến f0 : n = 3**
- **Biến f1 : n = 93**
  n = 3
- **Biến fn : n = 2**
  n = 93

5. Bảng kiểm thử

Var	Test case	input	expected	actual	result
n	1	0	0	0	pass
f0	2	3	2	2	pass
f1	3	93	9223372036854775807	9223372036854775807	pass
	4	3	2	2	pass
fn	5	2	1	1	pass
	6	93	9223372036854775807	9223372036854775807	pass