Grade 6 Math Circles
March 21/22/23, 2023
Control Flow - Problem Set

1. What is the difference between an `if` statement and a `switch case` statement?

2. What is the difference between a `for` loop and a `while` loop?

3. Circle whether or not the following pieces of code will stop looping (terminate). Give a brief explanation as to why or why not.

   (a) Terminates / Does not terminate

   ```
   1  for(i=0; i<5; i++) {
   2      print(i)
   3  }
   ```

   (b) Terminates / Does not terminate

   ```
   1  for(i=0; i<5; i--) {
   2      print(i)
   3  }
   ```

   (c) Terminates / Does not terminate

   ```
   1  i=1
   2  while(not i=0) {
   3      i=i/2
   4  }
   ```
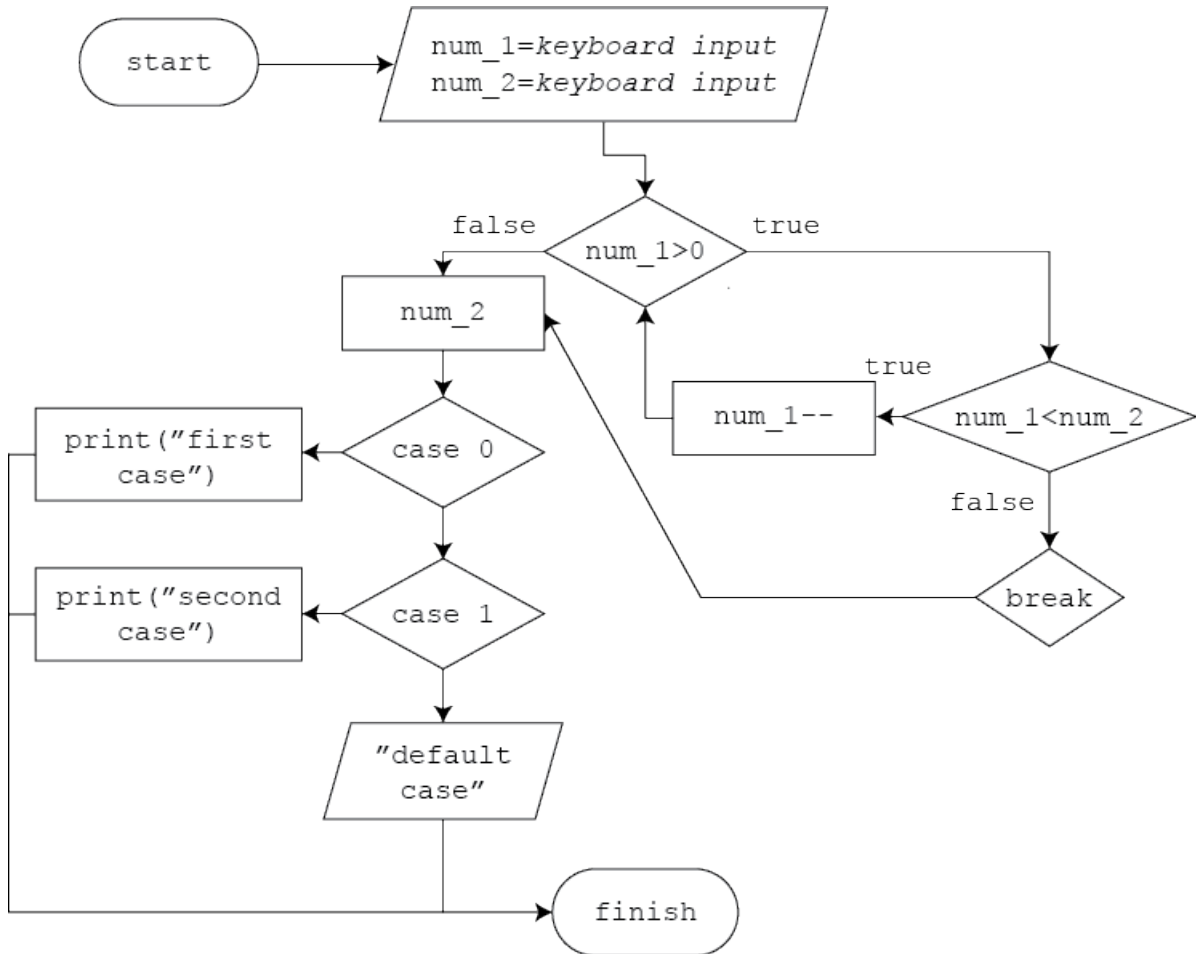
4. Based on the code, draw a control flow diagram. Note that x^2 means $x^2 = x \times x$.

```
1   x=3
2   y=4
3   z=0
4
5   while(not x^2+y^2=z^2) {
6       z++
7   }
8
9   sum=x+y+z
10
11  while(true) {
12      sum=sum/2-1
13      if(sum<0) {
14          break
15      } else {
16          sum++
17      }
18  }
```

5. Based on the following diagram, write pseudo-code that would match this diagram.

6. Based on the following diagram, track the value of x at the given points (A, B, and C).