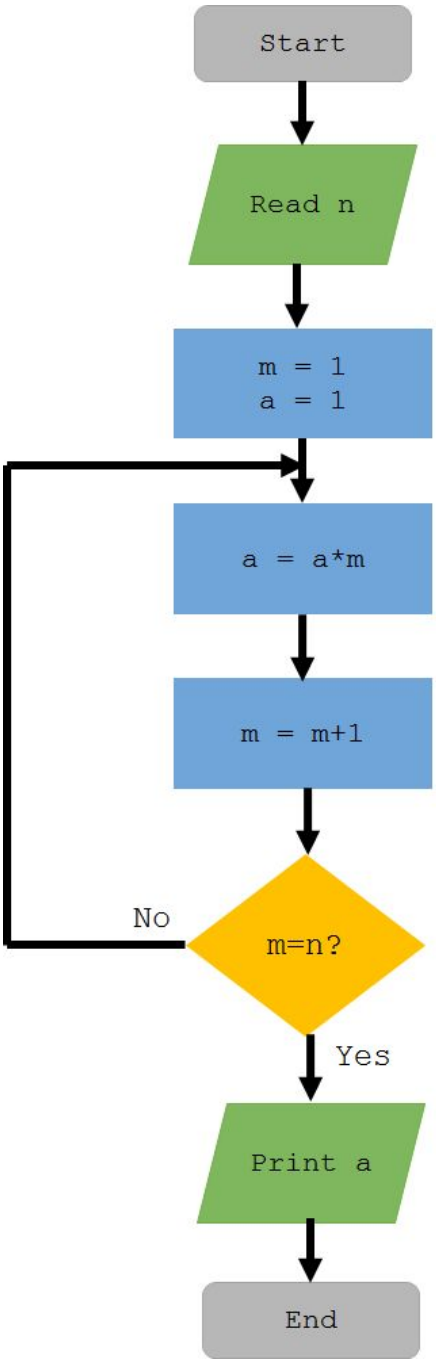
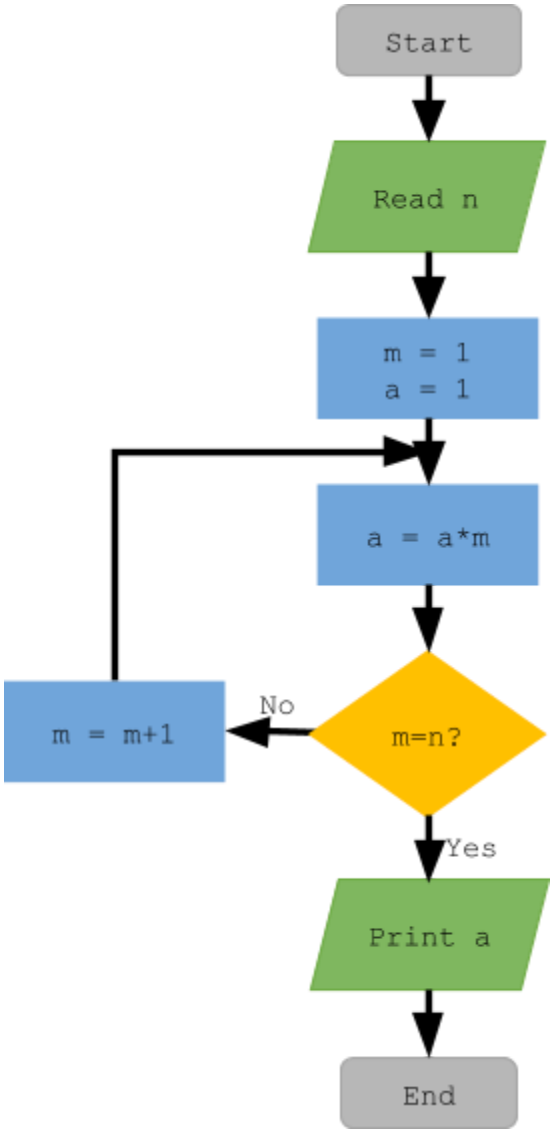
ITCS 201 – Fundamentals of Programming
Lecture 5: Lab Assignments

Q1: Given a flowchart, write a c program. Try to use `while`, `do…while`, and `for` to see how they work. Choose the suitable one to submit. We might ask you to explain using other techniques (says, why they work or why they do not).



Also, what is the purpose of this program? What will happen if you input `n = 0`?

Extra: given the flowchart below, what will happen? What is the difference between this figure and the first one? Which technique you should use?



Q2: Write a program to retrieve a number `n` (where `n > 2`) and print the list of Fibonacci at length of `n`. Each of them is separated using a space. You need to use `do while`, otherwise you will get **ZERO**.

Fibonacci numbers are generated from

$F_n = F_{n-1} + F_{n-2}$

,where $F_0 = 0$ and $F_1 = 1$.

You should use any forms of loop to solve this problem, otherwise you would get ZERO.

Hint

Step1: 0+1 = 1 ---- 0 1 1 (3 numbers)
Step2: 1+1 = 2 ---- 0 1 1 2 (4 numbers)
Step3: 1+2 = 3 ---- 0 1 1 2 3 (5 numbers)
Step4: 2+3 = 5 ---- 0 1 1 2 3 5 (6 numbers)
Step5: 3+5 = 8 ---- 0 1 1 2 3 5 8 (7 numbers)
Step6: 5+8 = 13 ---- 0 1 1 2 3 5 8 13 (8 numbers)

Sample inputs and outputs:

Case 1:

Input	Output	Expected screen
5	5 0 1 1 2 3	5 0 1 1 2 3

Case 2:

Input	Output	Expected screen
9	9 0 1 1 2 3 5 8 13 21	5 0 1 1 2 3 5 8 13 21

Q3: Write a program to find greatest common divisor (GCD) of two given integers.

Hint: think about the definition of GCD. It is the **largest** positive integer that can divide both of the integers.

For example
Given 30 and 60.
You can divide both by 2 and 3, but boh 2 and 3 are not GCD of 30 and 60. The greatest common divisor of 30 and 60 should be 30, which is the largest number that can divide both given numbers.

Warning: you might be able to find the solutions on the internet (yes, we know). However, if you cannot explain how you got the code, you will automatically get **ZERO for all questions**.

Case 1:

Input	Output	Expected screen
54 24	6	54 24 6

Case 2:

Input	Output	Expected screen
17 32	1	17 32 1

Q4: Write a program to check that the given number is a **Prime number** or not. The prime number is the number that cannot be evenly divided by any number except 1 and itself.

Warning: again, you might be able to find the solutions on the internet. However, if you cannot explain how you got the code, you will automatically get **ZERO for all questions**.

Case 1:

Input	Output	Expected screen
17	prime	17 prime

Case 2:

Input	Output	Expected screen
52	not prime	52 not prime