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Class: BCSE II Sem:First
Session 2020-21

**Assignment Set:** 1 **Problem No.** 2

**Problem Statement:** Write a program to generate the nth Fibonacci number iteratively and recursively. Check when there is overflow in the result and change the data types for accommodating higher values of inputs. Plot the Fibonacci number vs n graph.

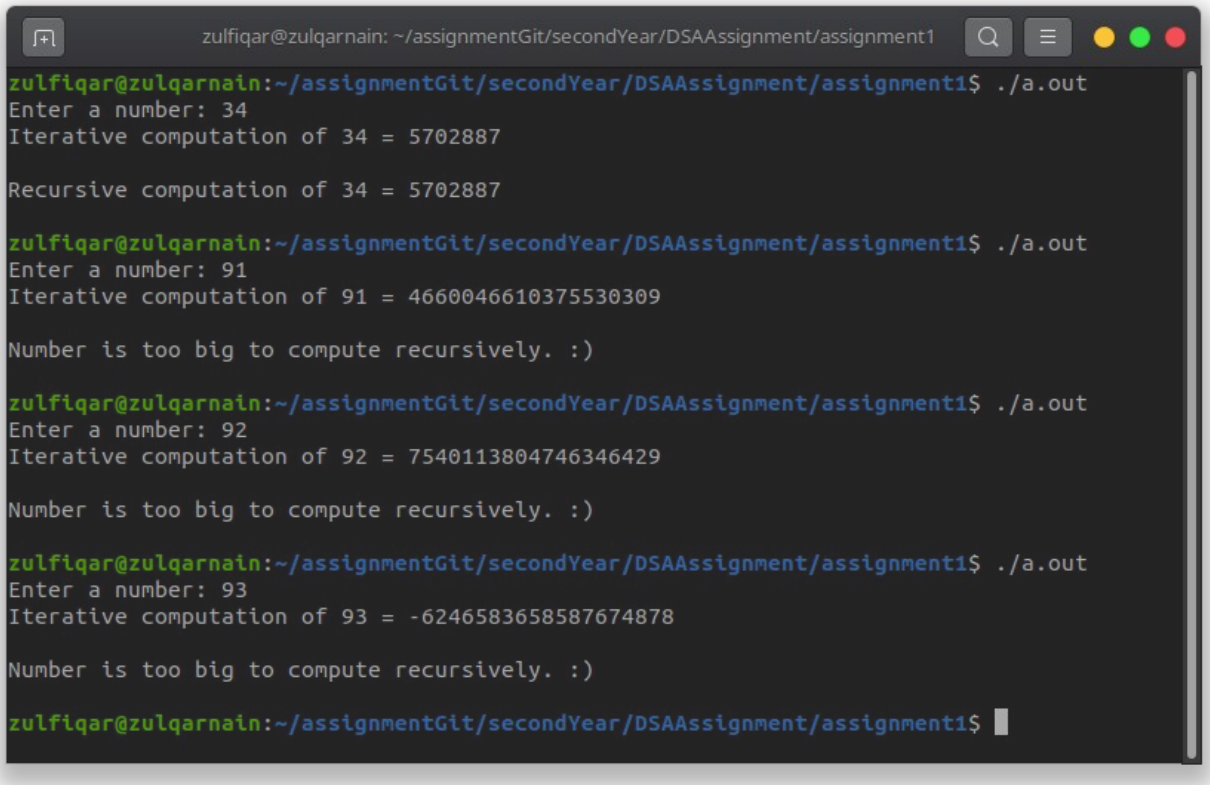
**Solution Approach:** Take a variable ‘sum’ initialised to 0, ‘prev1’ =1 and ‘prev2’=1; then run a loop where prev1 and prev2 are added with sum and prev1,prev2 are updated accordingly to store previous two fibonacci numbers, thus we get required nth fibonacci number.

**Structured Pseudocode:**

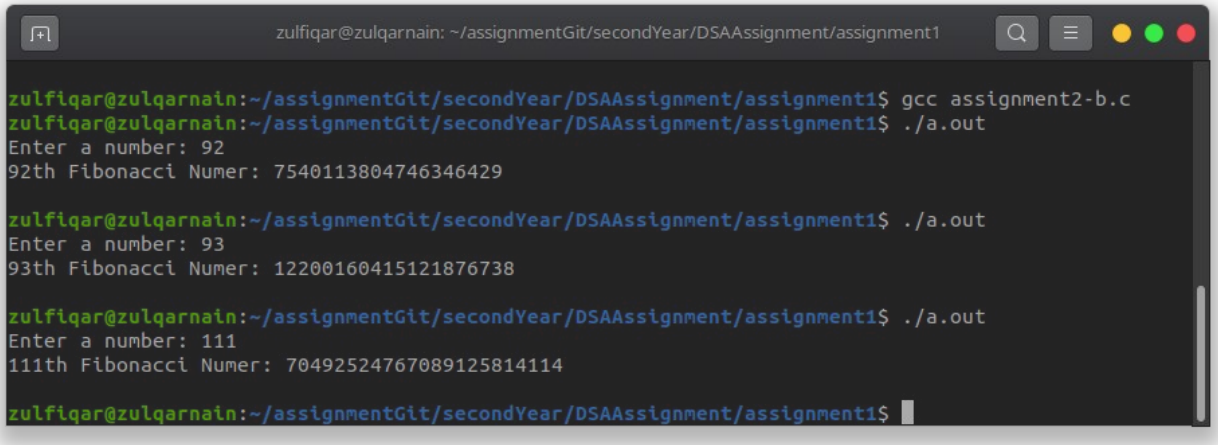
```
Read n
sum=0,prev1=1,prev2=1;
if n<=0:
   Invalid Number
else if n<=2:
   print 1
   end program
else
   for i=3 to n do:
      sum = prev1 + prev2
      prev1 = prev2
      prev2 = sum
   end for
end if
print sum
end program
```

**Results:**

output1:




output2:




**Discussion**

- In the results section , output1: We see 93th number is negative or overflow has occured for built in *long long* datatype.
- output2: here, an array of integer is used to represent an integer and corresponding function are defined to add such numbers. Thus we see here no overflow occures and higher values are shown.

**Separate files containing commented source code:** Two source code are attached,:
assaignment2-a.c :- It computes factorial using built in data type *long long* (64bit)
assignment2-b.c :- It computes factorial using an array of digit to represent the number.