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Class: BCSE II Sem:First
Session 2020-21

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

Problem Statement: Write a program to compute the factorial of an integer n iteratively and recursively. Check when there is overflow in the result and change the data types for accommodating higher values of inputs.

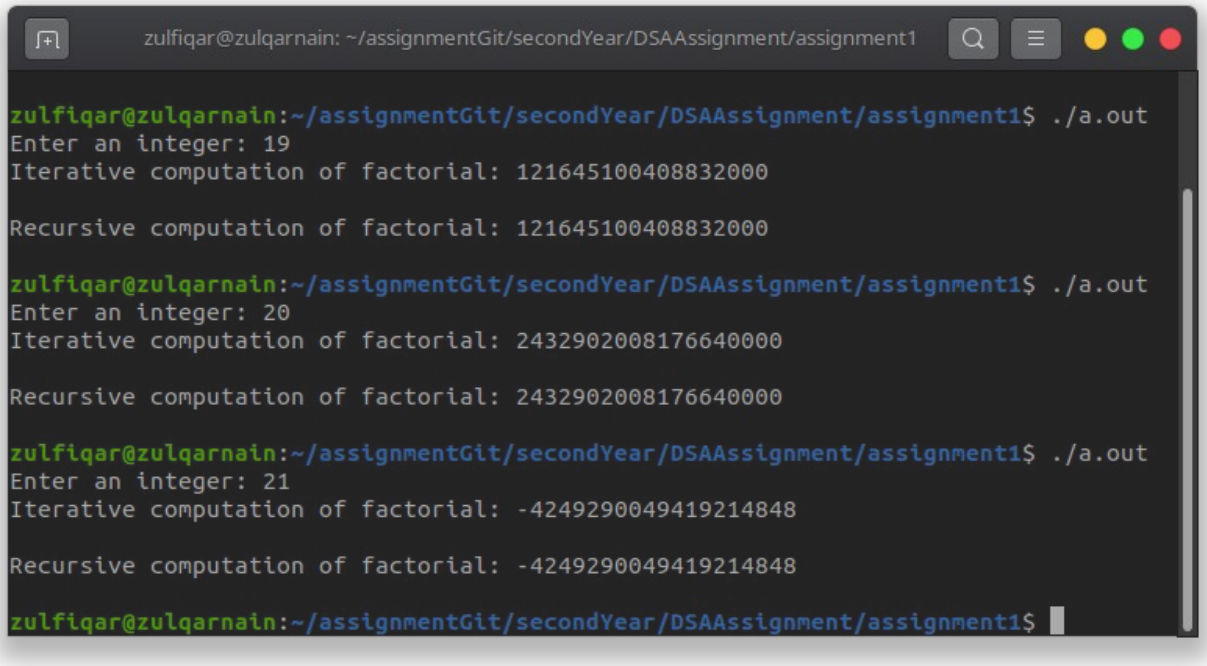
Solution Approach: Take a variable ‘product’ initialised to 1,then run a loop where it multiplies ‘product’ with no. Of iteration (1,2,3,...,n), thus we get , product=1*2*..*n

Structured Pseudocode:

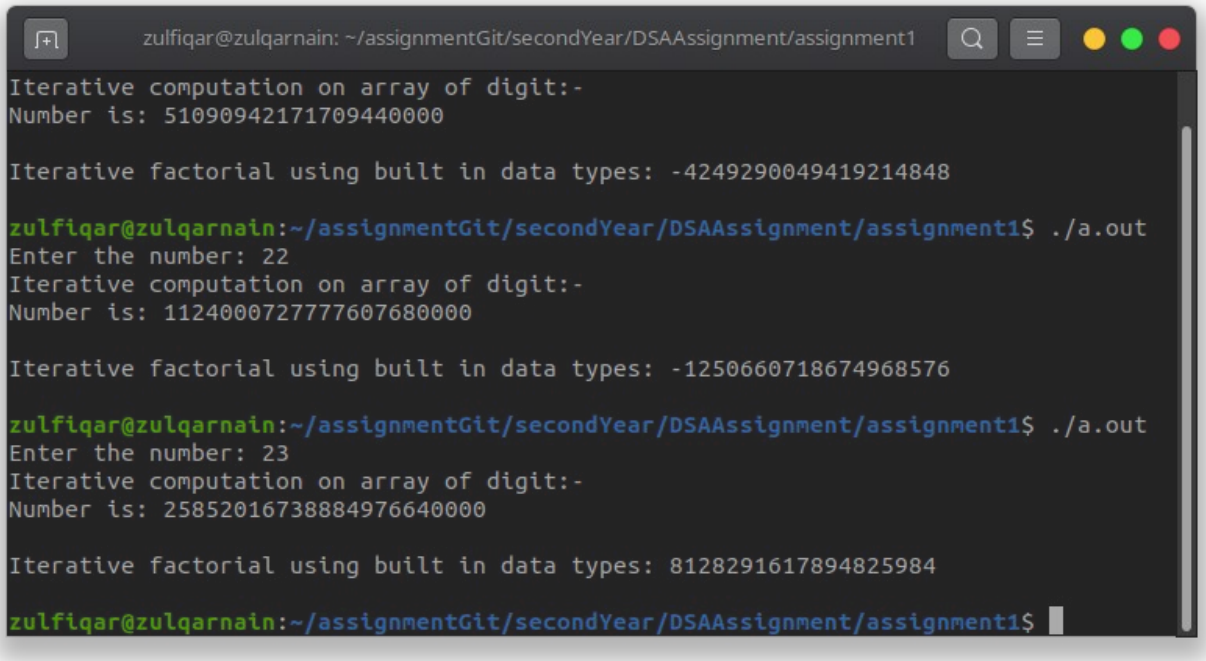
```
Read n
prod = 1
for i=1 to n do:
   prod = prod * i
end for
print prod
```

Results:

output1:



output2:



Discussion

- In the results section , we see the output1 of 19!,20!,21! computed using normal *long long* type(64bit), and it clearly overflows for the value 21!
- output2: here, an array of integer is used to represent an integer and corresponding function are defined to multiply such numbers. Thus we see here no overflow occures and higher values are shown.(But when computed iteratively using built in data type, overflow occured again)

Separate files containing commented source code: Two source code are attached,:
assaignment1-a.c :- It computes factorial using built in data type *long long* (64bit)
assignment1-b.c :- It computes factorial using an array of digit to represent the number.