Programming II

Comp 111

Spring 2022

Department of Computer Science

Forman Christian College University

Lab 3
Revision: Recursion

In Lab Problems

Question 1:

In mathematics, C_k^n denotes the number of different ways that k things can be selected from among n different choices. For example, if you are choosing among six desserts and are allowed to take two, the number of different combinations you could choose is C_2^6. Here's one formula to compute this value:

$$C_k^n = \frac{n!}{k!(n-k)!}$$

This value also gives rise to an interesting recursion:

$$C_k^n = C_{k-1}^{n-1} + C_k^{n-1}$$

Write a recursive code to calculate the expression.

Hints: when $k = 1$, $C_k^n = n$ and when $n < k$, $C_k^n = 0$.

Question 2:

Write and test a recursive function max to find the largest number in a list.

Question 3: Draw the environment diagram for the given recursive code.

```
def rec(x, y):
    if y > 0:
        return x * rec(x, y - 1)
    return 1
rec(3, 2)
```