

CS 1713 Intro to Programming II

1. (10pt) It is claimed that

$$\sum_{k=0}^m \binom{m}{k} \binom{n}{r-k} = \binom{m+n}{r}$$

The following C program checks if this claim is true or not for the given values of **m**, **r**, and **n**. To complete the program below, you are asked to (i) implement two missing functions in the next page, and (ii) determine the suitable parameters when calling them in `main()` .

`/* suppose we include the standard and textbook libraries here,
and give the user defined function prototypes here */`

```
void main()
{
    int m, r, n, lhs, rhs;
    printf("Get valid values for m r n: ");

    get_valid_data(.....); /* Pass parameters */

    lhs = compute_LHS(.....); /* Pass parameters */

    rhs = select( m + n,  r );
    if (lhs == rhs )
        printf("Yes, the claim is true\n");
    else
        printf("No, the claim is false\n")
}
```

2pt

NOTE: You can assume that `int fact(int x);` which computes factorial of `x` and

`int select(int x, int y);` which computes $\binom{x}{y}$ “x-choose-y” are already implemented here. So you don’t need to implement them. If needed, you can use them.

- a) (3pt) Implement/call a function `void get_valid_data(.....)`, which will keep asking user to enter valid values for **m**, **r**, and **n**. The conditions for valid data are as follows: **m**, **r**, and **n** are positive, AND **r** is greater than or equal to **m**, AND **n** is greater than or equal to **r**. (*Caution: this function is supposed to put the read values into the local variables **m**, **r**, and **n** in the main() function. So you need to think how to access the local variables in main() function from this get_valid_data() function*).

```
void get_valid_data(.....)
{
```

- b) (5pt) Implement/call a function `int compute_LHS(...)` which takes **m**, **r**, **n** as parameters and computes/returns the result for the left hand side, i.e., $\sum_{k=0}^m \binom{m}{k} \binom{n}{r-k}$

```
int compute_LHS(.....)
{
```