

## Some programs in C - Part 3

### (1) Correlation and Regression

#### The C Program

```
#include <stdio.h>
#include <math.h>

int main()
{
    int i, n;
    float x, y, sumx, sumy, sumsqr x, sumsqr y, sumproxy;
    float meanx, meany, sdx, sdy, covxy, r, byx, bxy;

    printf("TOTAL PAIRS(n) OF OBSERVATIONS : ");
    scanf("%d",&n);

    if(n < 2)
    {
        printf("\nTOTAL PAIRS OF OBSERVATIONS MUST BE ATLEAST 2");
        return 0;
    }

    sumx = sumy = sumsqr x = sumsqr y = sumproxy = 0;
    for(i=1; i<=n; i++)
    {
        printf("X%d Y%d: ",i,i);
        scanf("%f%f",&x,&y);
        sumx += x;
        sumsqr x += x * x;
        sumy += y;
        sumsqr y += y * y;
        sumproxy += x * y;
    }

    meanx = sumx/n;
    meany = sumy/n;
    sdx = sqrt(sumsqr x/n - meanx * meanx);
    sdy = sqrt(sumsqr y/n - meany * meany);
    covxy = sumproxy/n - meanx * meany;
```

```
r = covxy/(sdx * sdy);
byx = r * sdy/sdx;
bxy = r * sdx/sdy;

printf("\nMEAN (X) = %f",meanx);
printf("\nMEAN (Y) = %f",meany);
printf("\nSD (X) = %f",sdx);
printf("\nSD (Y) = %f",sdy);
printf("\nCOV (X,Y) = %f",covxy);
printf("\n\nr (X,Y) = %f",r);
printf("\n\nREGRESSION LINE OF Y ON X");
printf("\n\t Y = %f + (%f)X",meany - byx * meanx, byx);
printf("\n\nREGRESSION LINE OF X ON Y");
printf("\n\t X = %f + (%f)Y",meanx - bxy * meany, bxy);

return 0;
}
```