5

Case Study of Control Structures (for, while)

Problem Definition (1)

- Triangle of Stars
  - Input the “side” number
  - Then print the triangle of stars with the “side”
    - Use “for”

```
Enter the side= 10


**********
*********
********
*******
******
*****
****
***
**
*
Press any key to continue
```

Code - Stars

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

int main()
{

	int side;
	int i;
	int j;

	printf("Enter the side= ");
	scanf("%d",&side);
	printf("\n\n");

	for(i=side;i>=1;i--){
		for(j=1;j<=i;j++){
			printf("*");
		}
		printf("\n");
	}

	return 0;

}
```

Problem Definition (2)

- Prime number judgment
  - Input 2 different values : a, b. (a < b)
  - Find all prime numbers between a and b (include a, b)
  - Loop is “∞”

```
 input 2 values a, b (a<b) = 1 10
質數: 2  3  5  7
 input 2 values a, b (a<b) = 15 2
please input 2 different values again!!
 input 2 values a, b (a<b) = 9 9
please input 2 different values again!!
input 2 values a, b (a<b) = _
```

防呆!!

無窮迴圈 !!

Code - Prime Numbers

```c
#include <stdlib.h>
#include <stdio.h>
int main()
{
    int a; int b; int x; int y;
    while(1)   //無窮迴圈!!可連續輸入資料
    {
        printf("\n input 2 values a, b (a<b) = ");
        scanf("%d",&a); scanf("%d",&b);
        if(b>a&&b>=2) //b要大於等於2，因爲2是最小的質數!!
        {
            if (a<=2) //若a<2，那範圍內就有包含2
               printf("質數: 2 ");
            for(x=a;x<=b;x++)
            {
                for(y=2;y<=x;y++)
                {
                    if(x%y==0) //判斷質數與非質數，若條件成立，跳出LOOP
                     break;
                    else if (x==y+1) //判斷是否爲質數
                     printf(" %d ", x);//輸出質數

                }
            }
        }

        else
            printf("please input 2 different values again!!\n");//防呆!!避免輸入兩個同樣的數字!!
    }
    system ("pause");
    return 0;
}
```