Prime Number (質數1)
Q: Enter n: 13

A: 13 is prime

n % j
13 % 2 = 1
13 % 3 = 1
13 % 4 = 1
13 % 5 = 3
13 % 6 = 1
…
13%12 = 1

沒有一個 **j** 可以整除 **n**

Prime Number (質數1)
Q: Enter n: 24

A: 24 is not prime

n % j
24 % 2 = 0
24 % 3 = 0
24 % 4 = 0
24 % 5 = 4
24 % 6 = 0
…
24%23 = 1

至少有一個 **j** 可以整除 **n**

```
for (j=2;j<…;j++)
        if (n…j…) break;

if (j…) printf ("… prime\n");
else  printf ("… not prime\n");
```

Prime Factors (質因數2)
Q: Enter n: 70

A: 70 = 2×5×7

```
n % j = r
70 % 2 = 0
35 % 3 = 2
35 % 4 = 3
35 % 5 = 0
 7 % 6 = 1
 7 % 7 = 0
```

```
scanf("%i", &n);
for (j=2;j<…;j++)
        if (n%2==0){
                printf…
                n = …
        }
```

Prime Factors (質因數2)
Q: Enter n: 24

A: 24 = 2×2×2×3

```
n % j = r
24 % 2 = 0
12 % 2 = 0
 6 % 2 = 0
 3 % 3 = 0
```

```
scanf("%i", &n);
j=2;
while (n>?){
        if (n%?==0){
                printf…
                n = …
        }else
                //試下一個數
}
```

Prime Number (質數3)

Q: Enter max: 100

A: prime numbers are 2,3,5,7,11,13,…,97

```
for (n=2;n<100;n++){

    n=24;
    for (j=2;j<√n;j++)
            if (n%?==0) break;

    if(j…) printf…

}
```

Prime Number (質數4)

Array

Q: Enter max: 100

A: prime numbers are 2,3,5,7,11,13,…,97

j / n%j	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	…	
n=4	0	1																	
n=5	1	2	1																
n=6	0	0	2	1															
n=7	1	1	3	2	1														
n=8	0	2	0	3	2	1													
n=9	1	0	1	4	3	2	1												
:																			
100	0	1	0	0	4	2	4	1	…										

★凡可被 j 整除的都不是質數

Prime Number (質數1-100)

假設全部為質數(1)

```
int prime[101]={0};
for (i=1;i<101;i++) prime[i]=1;
```

非質數(0)

k=2	k=3	k=4
prime[4] = 0;	prime[6] = 0;	prime[8] = 0;
prime[6] = 0;	prime[9] = 0;	prime[12] = 0;
prime[8] = 0;	prime[12] = 0;	prime[16] = 0;
prime[10] = 0;	prime[15] = 0;	prime[20] = 0;
…	…	…
prime[100] = 0;	prime[99] = 0;	prime[100] = 0;

```
k=2;
for (j=2;j<…;j++)
        prime[...] = 0;
```

```
k=3;
for (j=2;j<…;j++)
        prime[...] = 0;
```

```
printf("100以內的質數: ");
for(i=2;i<100;i++)
        if(prime[i]==1) printf(...);
```

HCF/GCD

Q: Enter a,b: 18 24

A: common factors are 2,3,6

公因數

```
min =
printf ("A: common factors are ");

for (j=2; j<min; j++){

        if(_____________________________){
                printf (" %i, ",_____________);
                hcf =_____;
        }
}
printf ("\n最大公因數HCF= %i\n", hcf);
```