**Result**



```
C:\WINDOWS\system32\cmd.exe                                                        —    □    ×
Bisection Method
The number of iterations : 20.  The answer of 1th root : 2.404826
The number of iterations : 20.  The answer of 2th root : 5.520078
The number of iterations : 20.  The answer of 3th root : 8.653728

Linear Interpolation Method
The number of iterations : 6.  The answer of 1th root : 2.404826
The number of iterations : 4.  The answer of 2th root : 5.520078
The number of iterations : 4.  The answer of 3th root : 8.653728

Secant Method
The number of iterations : 5.  The answer of 1th root : 2.404825
The number of iterations : 5.  The answer of 2th root : 5.520078
The number of iterations : 4.  The answer of 3th root : 8.653728

Newton-Phapson Method
The number of iterations : 3.  The answer of 1th root : 2.404825
The number of iterations : 3.  The answer of 2th root : 5.520078
The number of iterations : 3.  The answer of 3th root : 8.653728

Newton with Bracketing Method
The number of iterations : 3.  The answer of 1th root : 2.404825
The number of iterations : 3.  The answer of 2th root : 5.520078
The number of iterations : 3.  The answer of 3th root : 8.653728

Muller Method
The number of iterations : 4.  The answer of 1th root : 2.404825
The number of iterations : 3.  The answer of 2th root : 5.520078
The number of iterations : 4.  The answer of 3th root : 8.653728

Nonlinear Equation Using Newton with Bracketing Method
The number of iterations : 12. The answer of 1th root : 1.000000
The number of iterations : 3. The answer of 2th root : 4.000000
The number of iterations : 3. The answer of 3th root : 7.000001
계속하려면 아무 키나 누르십시오 . . . _
```

## 과제1. Discuss the convergence speed of the methods.

각 방법들의 convergence speed를 비교해 본 결과, 이론대로 Bisection method가 가장 느렸고, 그 외의 방법들을 사용했을 때는 속도가 현저히 빨라졌다. 이론대로 Newton-Rhapson method가 Secant method보다 더 빨랐고, Secant method가 Linear Interpolation method보다 빨랐다. Newton-Rhapson method는 Newton with Bracketing method와 속도가 비슷하고, Muller method는 곡선을 이용하기 때문에 직선을 이용하는 Secant method보다 속도가 더 빠르다.

## 과제2. Solve one interesting nonlinear equation you want to solve using the routine of rtsafe.c

Newton with Bracketing method를 이용해 임의의 nonlinear equation의 해를 구했다. 위의 결과를 출력하기 위해 사용한 방정식은 (x-1)*(x-4)*(x-7)이다.