CZ3106 Symbolic Computing, Tutorial 1

Dr. Wang Jian-Sheng week 20-25 Jan 03

1. Give a method to represent floating point number with arbitrary accuracy (say in C), and algorithms for addition, substraction, multiplication, and division of the arbitrary accuracy floating point numbers.

2. What is the *Head* of the following mathematica expressions: `3`, `1/2`, `1.0000`, `Pi`, `I`, `{a,b,c}`, `"string"`, `a[0]`, `h[a,b,c]`, `a + b`, `x^2`? Why?

3. Discuss the similarity and differences of ordinary assignment `=` (also known as `Set[]`) and delayed assignment `:=` (also known as `SetDelayed[]`). Give an example where you can see the different effect.

4. What do you expect Mathematica to give you when you enter the following expressions?

(1) `x` — enter `x` and return, not value is assigned to it
(2) `f[x]` — assuming that no definition is given to `f`
(3) `x // f`
(4) `f @ x`
(5) `x // f[#]&`
(6) `x /.  x -> y` — assuming that no value are assigned to `x` and `y`
(7) `x //.  x -> y`
(8) `x = a; x`
(9) `?x` — after the previous line
(10) `x^2^3`
(11) `z /.  {z->1, z->2}`
(12) `z /.  {{z->1}, {z->2}}`
(13) `{1, 2, 3}^2`
(14) `{1, 1, -1}.{1, -2, -1}`
(15) `{a, b}*{c, d}`
(16) `f[x__] := Plus[x]; f[1,2,3]`

5. Consider the following definition of a Mathematica function:

```
f[n_] := n * f[n-1]
```

Why it does not work? What is the most important principle for Mathematica to evaluate an expression?

6. Discuss the meaning/function/use of the following Mathematica functions, operators, or punctuators, `N[]`, `D[]`, `Set[]`, `List[]`, `Module[]`, `Rule[]`, `;` (semi-colon), `,` (coma), `( )` (parentheses), `{}` (braces), `[ ]` (square brackets), `[[ ]]` (double square bracets), `%` (per cent sign).