## Exercise 4.6 Bespoke sort

```
{a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w\#}::Indices(position=independent).
      def bespoke_sort (expr):

      substitute
      (expr,$ x^{a}
      -> AAA01^{a}

      substitute
      (expr,$ g_{a b}
      -> AAA02_{a b}

                                                                                      $)
                                                                                      $)
           substitute (expr,$ \Gamma_{a b c} -> AAAO3_{a b c} $)
           sort_product
                               (expr)
10
11
                              (expr,$ AAA01^{a} -> x^{a} $)
(expr,$ AAA02_{a b} -> g_{a b} $)
(expr,$ AAA03_{a b c} -> \Gamma_{a b c} $)
           substitute
12
           substitute
13
           substitute
14
15
           return expr
16
17
18
19
      expr := g_{a b} x^{a} x^{b} + Gamma_{a b c} x^{a} x^{b} x^{c}. # cdb(ex-0406.100, expr)
20
21
      expr = bespoke_sort (expr)
                                                                                          # cdb(ex-0406.101,expr)
```

$$p = g_{ab}x^{a}x^{b} + \Gamma_{abc}x^{a}x^{b}x^{c}$$

$$= x^{a}x^{b}g_{ab} + x^{a}x^{b}x^{c}\Gamma_{abc}$$
(ex-0406.100)
(ex-0406.101)