GCD

2420010, RHEE, Suyeong

1. gcd (24, 36).

→ gcd (36, (24 rem 36)) ... by (gcd 2)

→ gcd (36, 24) ... by (remainder)

→ gcd (24, (36 rem 24)) ... by (gcd 2)

→ gcd (24, 12) ... by (rem)

→ gcd (12, (24 rem 12)) ... by (gcd 2)

→ gcd (12, 0) ... by (rem)

→ 12 ... by (gcd 1)

{ eq gcd (X, 0) = X. ... gcd 1

eq gcd (X, N₂Y) = gcd (N₂Y, X rem N₂Y). ... gcd 2

*) m rem NN = (rem m NN) = Remainder

FACT

1. fact (5).

→ 5 · fact (p 5) ... by (f2)

→ 5 · fact (4) ... by (p)

→ 5 · 4 · fact (p 4) ... by (f2)

→ 5 · 4 · fact (3) ... by (p)

→ 5 · 4 · 3 · fact (p 3) ... by (f2)

→ 5 · 4 · 3 · fact (2) ... by (p)

→ 5 · 4 · 3 · 2 · fact (p 2) ... by (f2)

→ 5 · 4 · 3 · 2 · fact (1) ... by (p)

→ 5 · 4 · 3 · 2 · 1 · fact (p 1) ... by (f2)

→ 5 · 4 · 3 · 2 · 1 · fact (0) ... by (p)

→ 5 · 4 · 3 · 2 · 1 · 1 ... by (f1)

→ 5 · 4 · 3 · 2 · 1 → 120

→ 5 · 4 · 3 · 2 = 120

→ 5 · 4 · 6

→ 5 · 24

all by (x)

eq fact (0) = 1. ... f1

eq fact (N₂X) = N₂X · fact (p N₂X). ... f2

*) p NN = (- nn 1) = Previous

OEDC-FACT

1. oedc-fact(5),
→ g(5, 1) ... by(of 2)
→ cond(5>1, g(5, 2·1)·g(S(5,1), 2·1), 5)
... by(g)
→ cond(true, g(5, 2·1)·g(S(5,1), 2·1), 5)
... by(>)
→ g(5, 2)·g(S(5,1), 2·1) ... by(cond1)
→ cond(5>2, g(5, 2·2)·g(S(5,1), 2·2), 5)
... by(g)
→ cond(true, g(5, 2·2)·g(S(5,2), 2·2), 5) ... by(>)
→ g(5, 4)·g(S(5,2), 2·2) ... by(cond1)
→ cond(5>4, g(5, 2·4)·g(S(5,4), 2·4), 5) ... by(g)
→ cond(true, g(5, 2·4)·g(S(5,4), 2·4), 5) ... by(>)
→ g(5, 8)·g(S(5,4), 2·4) ... by(cond1)
→ cond(5>8, g(5, 2·8)·g(S(5,8), 2·8), 5) ... by(g)
→ cond(false, g(5, 2·8)·g(S(5,8), 2·8), 5) ... by(>)
→ 5·g(S(5,4), 2·4) ... by(cond2)
→ g(1, 8) ... by(S + (x)op)
→ cond(1>8, g(1, 2·8)·g(S(1,8), 2·8), 1) ... by(g)
→ cond(false, g(1, 2·8)·g(S(1,8), 2·8), 1) ... by(>)
→ 5·1 ... by(cond2)
→ 5·g(S(5,2), 2·2) ... by((x)op)
→ g(3, 4) ... by(S + (x)op)
→ cond(3>4, g(3, 2·4)·g(S(3,4), 2·4) 3) ... by(g)
→ cond(false, g(3, 2·4)·g(S(3,4), 2·4) 3) ... by(>)

eq oedc-fact(0) = 1. ... of 1
eq oedc-fact(N₂X)
= g(N₂X, 1). ... of 2
eq g(X, Y) = cond(X > Y,
g(X, 2·Y)·g(S(X, Y), 2·Y),
X), ... g
eq cond(true, X, Y) = X ... cond 1
eq cond(false, X, Y) = Y ... cond 2

→ 5·3 ··· by (cond 2)

→ 15·g(sd(5,1),2·1) ··· by (x) op)

→ g(4,2) ··· by (sd + (x) op)

→ cond(4>2, g(4,2·2)·g(sd(4,2),2·2),4) ··· by (g)

→ cond (true, g(4,2·2)·g(sd(4,2),2·2),4) ··· by (>)

→ g(4,4)·g(sd(4,2),2·2) ··· by (cond 1) + (x) op)

→ cond(4>4, g(4,2·4)·g(sd(4,4),2·4),4) ··· by (g)

→ cond (false, g(4,2·4)·g(sd(4,4),2·4),4) ··· by (>)

→ 4·g(sd(4,2),2·2) ··· by (cond 2)

→ g(2,4) ··· by (sd + (x) op)

→ cond(2>4, g(2,2·4)·g(sd(2,4),2·4),2) ··· by (g)

→ cond (false, g(2,2·4)·g(sd(2,4),2·4),2) ··· by (>)

→ 4·2 ··· by (cond 2)

→ 15·8 ··· by (x) op)

→ 120