

Pensieve header: January 20: Dangerous games with Unprotect.

```

s1[1] = {"", "1"}; (* s1 for "set listing" *)
s1[n_] := s1[n] = Join[
  s1[n-1],
  {#<> ToString[n] & /@ Reverse[s1[n-1]]}
]

s1[5] /. "" -> "ϕ"
{ϕ, 1, 12, 2, 23, 123, 13, 3, 34, 134, 1234, 234, 24, 124, 14, 4, 45, 145,
  1245, 245, 2345, 12345, 1345, 345, 35, 135, 1235, 235, 25, 125, 15, 5}

SetAttributes[StringJoin, Listable];
s12[1] = {"", "1"};
s12[n_] := s12[n] = Join[
  s12[n-1],
  Reverse[s12[n-1]] <> ToString[n]
]

s12[5] /. "" -> "ϕ"
{ϕ, 1, 12, 2, 23, 123, 13, 3, 34, 134, 1234, 234, 24, 124, 14, 4, 45, 145,
  1245, 245, 2345, 12345, 1345, 345, 35, 135, 1235, 235, 25, 125, 15, 5}

Head /@ {7, "Love", Expand[(x+y)^2], x}
{Integer, String, Plus, Symbol}

(s_String) <> (n_Integer) := s <> ToString[n]
Join::heads: Heads PacletManager`Package`LDCfindForDocResource and
PacletManager`Package`MCfindForDocResource at positions 1 and 2 are expected to be the same.
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PacletManager`Package`MCfindForDocResource at positions 1 and 2 are expected to be the same.
SetDelayed::write: Tag StringJoin in s_String <> n_Integer is Protected.
$Failed

Unprotect[StringJoin];
(s_String) <> (n_Integer) := s <> ToString[n]

"Love" <> 7
Love7

(* Why restrict to n_Integer? Can you do better? *)

```

```

SetAttributes[StringJoin, Listable];
s13[1] = {"", "1"};
s13[n_] := s13[n] = Join[
  s13[n - 1],
  Reverse[s13[n - 1]] <> n
]

s13[5] /. "" -> "∅"
{∅, 1, 12, 2, 23, 123, 13, 3, 34, 134, 1234, 234, 24, 124, 14, 4, 45, 145,
  1245, 245, 2345, 12345, 1345, 345, 35, 135, 1235, 235, 25, 125, 15, 5}

Unprotect[Plus];
a_ + b_ := a * b

2 + 3
5

2 x + 3 x (* Thanks, Jonathan Love! *)
6 x2

Head[2 x]
Times

Head /@ (2 x)
Integer Symbol

? NonCommutativeMultiply

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Information::nomatch : No symbol matching {N, o, n, C, o, m, m, u, t, a, t, i, v, e, M, u, l, t, i, p, l, y} found.

```