User-defined Aggregates

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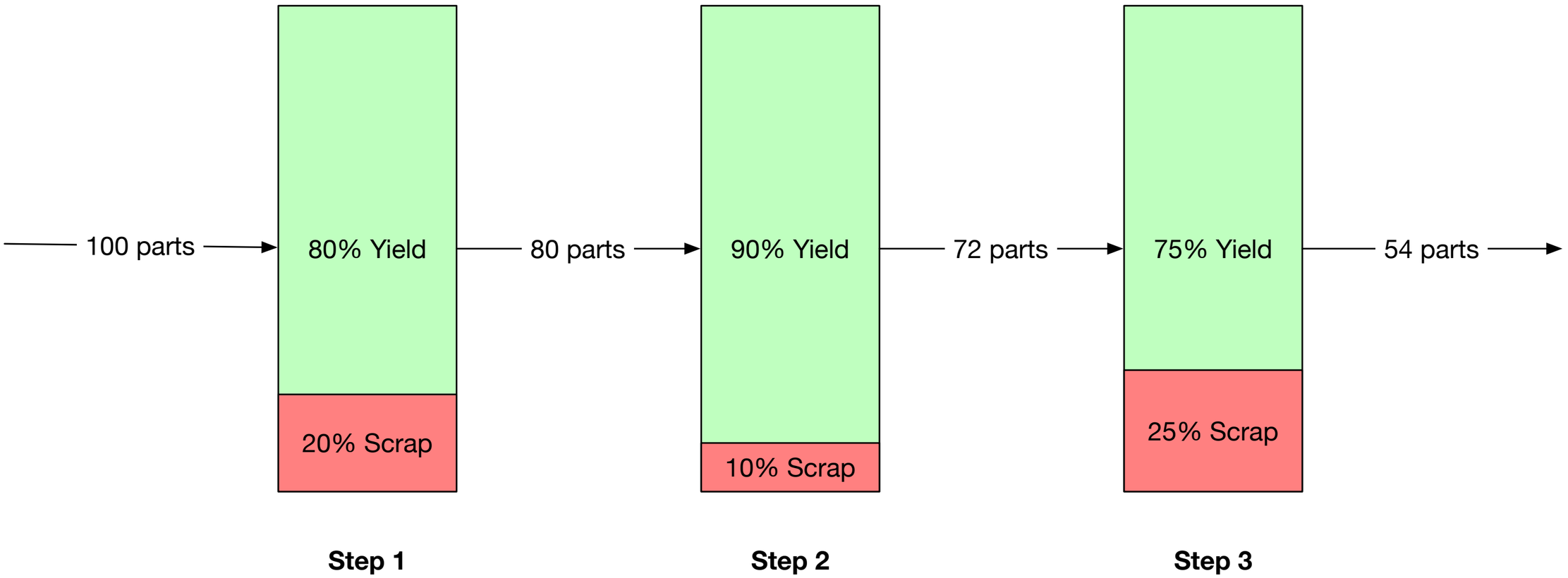
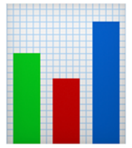
Manufacturing 🏭



Rolled Throughput Yield [1] 🔮

$$
\begin{aligned}
rty &= yield\ at\ step\ 1 * yield\ at\ step\ 2 * \ldots * yield\ at\ step\ n \\
&= 80\% * 90\% * 75\% \\
&= 54\%
\end{aligned}
$$

[1] https://en.wikipedia.org/wiki/Rolled_throughput_yield

RTY: Sample Data 

```sql
CREATE TABLE yields AS
SELECT *
FROM (VALUES
   ('day-1', 'step-1', 0.80),
   ('day-1', 'step-2', 0.90),
   ('day-1', 'step-3', 0.75),
   ('day-2', 'step-1', 0.90),
   ('day-2', 'step-2', 0.80),
   ('day-2', 'step-3', 0.99)
) vals(day, step, yield);
```

RTY: Use product aggregate 😢

```
SELECT "day", product("yield")
FROM yields
GROUP BY 1;
```

```
ERROR:  function product(numeric) does not exist
LINE 1: SELECT day, product(yield)
```

Create a User-defined Aggregate 

```
CREATE FUNCTION product_sf(state anyelement, val anyelement) RETURNS anyelement
LANGUAGE sql IMMUTABLE
AS $$
  SELECT $1 * $2;
$$;


CREATE AGGREGATE product(anyelement) (
  initcond = 1,
  sfunc    = product_sf,
  stype    = anyelement
);
```

Use User-defined Aggregate ✨

```
SELECT "day", product("yield")
FROM yields
GROUP BY 1;
```

```
  day   | product
--------+-----------
 day-2 | 0.712800
 day-1 | 0.540000
```

Even works as a Window Function 🤩

```
SELECT *, product("yield") OVER (PARTITION BY "day" ORDER BY "step")
FROM yields;
```

day	step	yield	product
day-1	step-1	0.80	0.80
day-1	step-2	0.90	0.7200
day-1	step-3	0.75	0.540000
day-2	step-1	0.90	0.90
day-2	step-2	0.80	0.7200
day-2	step-3	0.99	0.712800