ECL Cheat Sheet

A simple introduction to ECL — so you can master it with ease.

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Dataset

A representation of data on disk or created in memory. Most ECL functions return a DATASET.

```
Layout := RECORD
    STRING pickup_dt;
    DECIMAL8_2 fare;
END;

//Reading inline data
memDs := DATASET([{'2015-01-01 01:08:56', 25.10},
                  {'2015-01-01 02:10:22', 40.15}],
Layout);

OUTPUT(memDs);

//Reading CSV file data
fileDs := DATASET(

'~tutorials::cheatsheet::in::sample_trip_1.csv',
          Layout, CSV);

OUTPUT(fileDs);
```

Summarize

Provides a large set of functions to summarize values in a dataset. Can be used in functions with GROUP and TABLE to create Pivots.

```
Layout := RECORD
    STRING pickup_dt;
    DECIMAL8_2 fare;
END;

ds := DATASET([{'2015-01-01 01:08:56', 25.10},
               {'2015-01-01 02:10:22', 40.15}],
Layout);

sumVal := SUM(ds, ds.fare);
avgVal := AVE(ds, ds.fare);
minVal := MIN(ds, ds.fare);
maxVal := MAX(ds, ds.fare);
countVal := COUNT(ds);

OUTPUT(DATASET([{'sum',sumVal},
                {'avg',avgVal},
                {'min', minVal},
                {'max', maxVal},
                {'count', countVal}],
                {String typ, DECIMAL8_2 val}));
```

INPUT

pickup_dt	Fare
2015-01-01 01:08:56	25.10
2015-01-01 02:10:22	40.15

OUTPUT

typ	val
sum	65.25
ave	32.63
min	25.1
max	40.15
count	2

Group

Easily work with cross tab functionality by using GROUP and TABLE functions.

```
Layout := RECORD
    STRING10 pickup_date;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
END;

ds := DATASET([{'2015-01-01', 25.10, 5},
               {'2015-01-01', 40.15, 8},
               {'2015-01-02', 30.10, 6},
               {'2015-01-02', 25.15, 4}], Layout);

crossTabLayout := RECORD
   ds.pickup_date;
   avgFare := AVE(GROUP, ds.fare);
   totalFare := SUM(GROUP, ds.fare);
   varianceFare := VARIANCE(GROUP, ds.fare);
   coVarianceFareDist := COVARIANCE(GROUP,
                         ds.fare, ds.distance);
   correlateFareDist := CORRELATION(GROUP,
                         ds.fare, ds.distance);
END;

crossTabDs := TABLE(ds, crossTabLayout, pickup_date);
OUTPUT(crossTabDs);
```

INPUT

pickup_date	fare	distance
2015-01-01	25.10	5
2015-01-01	40.15	8
2015-01-02	30.10	6
2015-01-02	25.15	4

OUTPUT

pickup_date	avgfare	totalfare	variance fare	covariancefaredist	correlatefaredist
2015-01-01	32.625	62.25	56.62	11.28	1
2015-01-02	40.15	8	6.125	2.47	1

Observe Subset

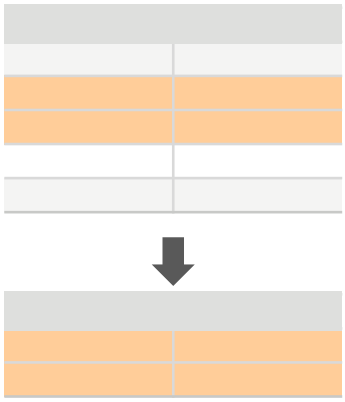
Select a subset of rows in a dataset for observation.

```
Layout := RECORD
    STRING10 pickup_date;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
END;

ds := DATASET([{'2015-01-01', 25.10, 5},
               {'2015-01-01', 40.15, 8},
               {'2015-01-02', 30.10, 6},
               {'2015-01-02', 25.15, 4}], Layout);

//Filter records by fields
filterDs :=  ds(pickup_date='2015-01-01');
//Remove duplicate records
dedupDs := DEDUP(SORT(ds, pickup_date),
pickup_date);
//Returns top N records
choosenDs := CHOOSEN(ds, 2);//Return top 2 records
//Return top N records after sorting
topDs := TOPN(ds, 2, pickup_date);
//Return sample part of set
sampleDs := SAMPLE(ds, 2, 1);//return every 2nd
record
//Return sample set of records
enthDs := ENTH(ds, 1, 2, 1);//1 out of every 2

OUTPUT(filterDs);
OUTPUT(dedupDs);
OUTPUT(topDs);
OUTPUT(sampleDs);
OUTPUT(enthDs);
```



Shaping with PROJECT

Used to transform datasets with the same number of records but transformed columns.

```
IMPORT Std;

InputLayout := RECORD
    STRING10 pickup_datetime;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
END;

OutputLayout := RECORD
    Std.Date.Date_t pickup_date;
    Std.Date.Time_t pickup_time;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
END;

inputDs := DATASET([{'2015-01-01 10:00:00', 25.10, 5},
                {'2015-01-01 11:00:00', 40.15, 8},
                {'2015-01-02 10:00:00', 30.10, 6},
                {'2015-01-02 11:00:00', 25.15, 4}],
                    InputLayout);

outputDs := PROJECT(inputDs, TRANSFORM(OutputLayout,
   SELF.pickup_date :=
Std.Date.FromStringToDate(LEFT.pickup_datetime[..10]
, '%Y-%m-%d'),
   SELF.pickup_time :=
Std.Date.FromStringToTime(LEFT.pickup_datetime[12..]
, '%H:%M:%S'),
   SELF.fare := LEFT.fare,
   SELF.distance := LEFT.distance));
OUTPUT(outputDs);
```

SHAPING WITH PROJECT

pickup_datetime	fare	dist
2015:01:01 10:00:00	25.10	5
2015:01:01 11:00:00	40.15	8
2015:01:02 10:00:00	30.10	6
2015:01:02 10:00:00	25.15	4

pickup_dt	pickup_tm	fare	dist
20150101	100000	25.10	5
20150101	110000	40.15	8
20150102	100000	30.10	6
20150102	110000	25.15	4

Try these examples at:
https://play.hpccsystems.com:18010/#/stub/ECL-DL/Playground

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Shape with Rollup

In one way, ROLLUP is used combine related records into a single aggregate record, like an aggregating SQL self join.

```
Layout := RECORD
    STRING10 pickup_date;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
    DECIMAL8_2 mileageDeduction := 0;
END;

inputDs := DATASET([{'2015-01-01', 25.10, 5},
                {'2015-01-01', 40.15, 8},
                {'2015-01-02', 30.10, 6},
                {'2015-01-02', 25.15, 4}], Layout);

// Rollup (aggregate) data daily
outputDs := ROLLUP(SORT(inputDs, pickup_date),
LEFT.pickup_date=RIGHT.pickup_date,
                  TRANSFORM(Layout,
                    SELF.pickup_date :=
                    LEFT.pickup_date,
                    SELF.fare :=  LEFT.fare +
                    RIGHT.fare,
                    SELF.distance := LEFT.distance
                    + RIGHT.distance,
                    SELF.mileageDeduction :=
                    self.distance * 0.545));

OUTPUT(outputDs);
```

Shape Parent Child Rollup

Rollup records into a parent child layout.

```
InputLayout := RECORD
    STRING10 pickup_date;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
END;
OutputLayout := RECORD
    STRING10 pickup_date;
    DATASET(InputLayout) trips;
END;

inputDs := DATASET([{'2015-01-01', 25.10, 5},
                {'2015-01-01', 40.15, 8},
                {'2015-01-02', 30.10, 6},
                {'2015-01-02', 25.15, 4}],
InputLayout);

groupDs := GROUP(SORT(inputDs, pickup_date),
pickup_date);

tempDs := ROLLUP(groupDs, GROUP,
TRANSFORM(OutputLayout,
          SELF.pickup_date := LEFT.pickup_date,
          SELF.trips := ROWS(LEFT)));

OUTPUT(tempDs);
```

pickup_datetime	fare	distance
2015:01:01 10:00:00	25.10	5
2015:01:01 11:00:00	40.15	8
2015:01:02 10:00:00	30.10	6
2015:01:02 10:00:00	25.15	4

Shape with Normalize

Break contents of record into normal form.

```
IMPORT Std;

InputLayout := RECORD
    UNSIGNED ride_id;
    STRING passenger_state;
END;

inputDs := DATASET([{1, 'group cool talkative'},
                {2, 'calm quite'},
                {3, 'temper nasty'},
                {4, 'drunk smell'}], InputLayout);

 OutputLayout := RECORD
     UNSIGNED ride_id;
     STRING100 word;
 END;

wordDs := NORMALIZE(inputDs,

STD.Str.WordCount(LEFT.passenger_state),
              TRANSFORM(OutputLayout,
                        SELF.ride_id :=
                        LEFT.ride_id,
                        SELF.word :=
STD.Str.ToUpperCase(

STD.Str.GetNthWord(LEFT.passenger_state,
COUNTER))));
OUTPUT(wordDs);
```

NORMALIZE

ride_id	passenger_state
1	group cool talkative
2	calm quiet
3	temper nasty
4	drunk smell

NORMALIZE

ride_id	word
1	group
1	cool
1	talkative
2	calm
2	quiet
3	temper
3	nasty
4	drunk
4	smell

SHAPING WITH ROLLUP

pickup_date	fare	distance	mileagededuction
2015:01:01	65.25	13	7.09
2015:01:02	55.25	20	5.45

SHAPING WITH PARENT CHILD ROLLUP

pickup_date	trips		
	pickup_date	fare	distance
2015-01-01	2015-01-01	25.1	5
	2015-01-01	40.15	8
2015-01-02	2015-01-2	30.1	6
	2015-01-02	25.15	4

Denormalize

Combine data from two normalized Datasets.

```
WeatherLayout := RECORD
    STRING10 weather_date;
    UNSIGNED hour_of_day;
    DECIMAL8_2 rain_quantity;
END;
TripLayout := RECORD
    STRING10 pickup_date;
    DECIMAL8_2 fare;
    DECIMAL8_2 distance;
    DATASET(WeatherLayout) weatherDs ;
END;
tripDs := DATASET(
  [{'2015-01-01', 25.10, 5, []},
   {'2015-01-01', 40.15, 8, []},
   {'2015-01-02', 30.10, 6, []},
   {'2015-01-02', 25.15, 4, []}], TripLayout);

weatherDs := DATASET(
  [{'2015-01-01', 1, 0.5},
   {'2015-01-01', 2, 1},
   {'2015-01-02', 1, 0},
   {'2015-01-02', 2, 0}], WeatherLayout);

outputDs := DENORMALIZE(
   tripDs, weatherDs,
   LEFT.pickup_date=RIGHT.weather_date,
   GROUP,
   TRANSFORM(TripLayout,
          SELF.pickup_date := LEFT.pickup_date,
          SELF.fare := LEFT.fare,
          SELF.distance := LEFT.distance,
          SELF.weatherDs := ROWS(RIGHT)));
OUTPUT(outputDs);
```

SHAPING WITH DENORMALIZE

pickup_date	fare	distance
2015-01-01	25.10	5
2015-01-01	40.15	8
2015-01-02	30.10	6
2015-01-02	25.15	4

+

weather_date	hour	rain_quantity
2015-01-01	1	50.5
2015-01-01	2	1
2015-01-02	1	0
2015-01-02	2	0

pickup_date	fare	distance	weatherds	
			weather_date	hour	rain_quantity
2015-01-01	21.5	5	2015-01-01	1	0.5
			2015-01-01	2	1
2015-01-01	40.15	8	2015-01-01	1	0.5
			2015-01-01	2	1
2015-01-02	30.1	6	2015-01-02	1	0
			2015-01-02	2	0
2015-01-02	25.15	4	2015-01-02	1	0
			2015-01-02	2	0

Combine

Used to transform datasets with the same number of records but transformed columns.

```
TripLayout := RECORD
    STRING10 pickup_date;
    DECIMAL8_2 distance;
END;

WeatherLayout := RECORD
    STRING10 weather_date;
    DECIMAL8_2 rain_quantity;
END;

tripDs := DATASET(
  [{'2015-01-01', 11000},
   {'2015-01-02', 12500},
   {'2015-01-03', 11800},
   {'2015-01-04', 13000}], TripLayout);

weatherDs := DATASET(
    [{'2015-01-01', 0.5},
     {'2015-01-02', 1},
     {'2015-01-05', 0},
     {'2015-01-06', 0}], WeatherLayout);
```

MERGING DATASETS

pickup_date	distance
2015-01-01	11000
2015-01-01	12500
2015-01-03	11800
2015-01-04	13000

+

weather_date	rain_quantity
2015-01-01	0.5
2015-01-02	1
2015-01-05	0
2015-01-06	0

Try the code at :

https://play.hpccsystems.com:18010/#/stub/ECL-DL/Playground

and view the results

```
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date);//Only those records that exist in both
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date,LEFT OUTER);//At least one record for every record in
the left
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date,RIGHT OUTER);//At least one record for every record in
the right
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date,FULL OUTER);//At least one record for every record in
the left and right
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date,LEFT ONLY);//One record for each left record with no
match in the right
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date,RIGHT ONLY);//One record for each right record with no
match in the left
JOIN(tripDs, weatherDs, LEFT.pickup_date=RIGHT.weather_date,FULL ONLY);//One record for each left and right record
with no match in the opposite
```