



INTEGO
GROUP

SAS Features We Underestimate

Andrii Borzenkov – Intego Group – Kharkiv – UKRAINE



May 1st, 2022



Hash Table



```
data src;
  set sashelp.geoexp;
  ord1 = x;
  ord2 = y;
run;

proc sort data = src out = sorted_proc;
  by ord1 ord2;
run;

data _null_;
  if _n_=1 then do;
    if 0 then set src;
    declare hash h(dataset:'src', ordered:'y', multidata:'y');
    h.definekey('ord1', 'ord2');
    h.definedata(all:'y');
    h.definedone();
  end;
  rc=h.output(dataset:'sorted_hash');
run;
```

Proc Sort Log

```
75 proc sort data = src out = sorted_proc;  
76 by ord1 ord2;  
77 run;
```

NOTE: There were 479784 observations read from the data set WORK.SRC.

NOTE: The data set WORK.SORTED_PROC has 479784 observations and 4 variables.

NOTE: PROCEDURE SORT used (Total process time):

real time 0.14 seconds

user cpu time 0.25 seconds

system cpu time 0.06 seconds

memory 42932.42k

OS Memory 69364.00k

Timestamp 04/18/2022 06:44:42 PM

Step Count 129 Switch Count 7

Page Faults 0

Page Reclaims 10119

Page Swaps 0

Voluntary Context Switches 2330

Involuntary Context Switches 0

Block Input Operations 0

Block Output Operations 30216

Hash Sort Log

```
79 data _null_;
80 if _n_=1 then do;
81 if 0 then set src;
82 declare hash h(dataset:'src', ordered:'y', multidata:'y');
83 h.definekey('ord1', 'ord2');
84 h.definedata(all:'y');
85 h.definedone();
86 end;
87 rc=h.output(dataset:'sorted_hash');
88 run;
```

NOTE: There were 479784 observations read from the data set WORK.SRC.

NOTE: The data set WORK.SORTED_HASH has 479784 observations and 4 variables.

NOTE: DATA STEP stopped due to looping.

NOTE: DATA statement used (Total process time):

real time 0.69 seconds

user cpu time 0.68 seconds

system cpu time 0.02 seconds

memory 73457.21k

OS Memory 102116.00k

Timestamp 04/18/2022 06:44:43 PM

Step Count 130 Switch Count 4

Page Faults 0

Page Reclaims 16568

Page Swaps 0

Voluntary Context Switches 17

Involuntary Context Switches 0

Block Input Operations 0

Block Output Operations 30216

Option Presorted



```
proc sort data = sashelp.geoexp out = src;  
    by x y;  
run;  
  
proc sort data = src out = sorted1;  
    by x y;  
run;  
  
proc sort data = src out = sorted2 presorted;  
    by x y;  
run;
```

Sorted1 Log

```
73 proc sort data = src out = sorted1;  
74 by x y;  
75 run;
```

NOTE: Input data set is already sorted; it has been copied to the output data set.

NOTE: There were 479784 observations read from the data set WORK.SRC.

NOTE: The data set WORK.SORTED1 has 479784 observations and 2 variables.

NOTE: PROCEDURE SORT used (Total process time):

real time 0.02 seconds

user cpu time 0.02 seconds

system cpu time 0.01 seconds

memory 3430.75k

OS Memory 31656.00k

Timestamp 04/18/2022 06:57:17 PM

Step Count 137 Switch Count 3

Page Faults 0

Page Reclaims 508

Page Swaps 0

Voluntary Context Switches 17

Involuntary Context Switches 1

Block Input Operations 0

Block Output Operations 15368

Sorted2 Log

```
77 proc sort data = src out = sorted2 presorted;  
78 by x y;  
79 run;
```

NOTE: Input data set is already sorted; it has been copied to the output data set.

NOTE: There were 479784 observations read from the data set WORK.SRC.

NOTE: The data set WORK.SORTED2 has 479784 observations and 2 variables.

NOTE: PROCEDURE SORT used (Total process time):

real time 0.02 seconds

user cpu time 0.01 seconds

system cpu time 0.00 seconds

memory 3427.12k

OS Memory 31656.00k

Timestamp 04/18/2022 06:57:17 PM

Step Count 138 Switch Count 3

Page Faults 0

Page Reclaims 485

Page Swaps 0

Voluntary Context Switches 14

Involuntary Context Switches 0

Block Input Operations 0

Block Output Operations 15368



Interactive: Table / Listing



Prepare Data And Style

```
proc template;  
  define style mystyle;  
    import "&cur_folder.style.css";  
    class body /  
      prehtml="<script language=javascript type='text/javascript'  
src='main.js'></script>"  
    ;  
  end;  
run;  
  
%include "&cur_folder.data.sas";
```

```
ods html
  file = "&cur_folder.rep.html" (title = "&title1")
  style = mystyle
;

proc report data = rep;
  column col1 ("Treatment Group" col2 col3);

  define col1 / display style(column) = [just = l cellwidth = 30% asis = on];
  define col2 / display style(column) = [just = c cellwidth = 30%];
  define col3 / display style(column) = [just = c cellwidth = 30%];
run;
```

Show time



Interactive: Figure



Making GTL Figure

```
proc template;  
  define statgraph myfig;  
    begingraph;  
      entrytitle "&title1";  
      entrytitle "&title2";  
      layout overlay;  
        scatterplot x=year y=mean_height /  
          group = sex name = 'scatter'  
          ;  
        discretelegend "scatter";  
      endlayout;  
    endgraph;  
  end;  
run;
```

```
filename myhtml "&cur_folder.fig.html";

ods graphics / imagemap;

ods html
  file=myhtml (title = "&title1")
  gpath="&cur_folder"
;
proc sgrender
  data = height_data(where = (age_group = 18))
  template = myfig
;
run;
ods _all_ close;
```

Show time



Style via CSS



Prepare Data And Style

```
proc template;  
  define style mystyle;  
    import "&cur_folder.style.css";  
    class body /  
      prehtml="<script language=javascript type='text/javascript'  
src='main.js'></script>"  
    ;  
  end;  
run;  
  
%include "&cur_folder.data.sas";
```

Prepare Data And Style2

```
proc template;  
  define style mystyle;  
    import "&cur_folder.style2.css";  
    class body /  
      prehtml="<script language=javascript type='text/javascript'  
src='main.js'></script>"  
    ;  
  end;  
run;  
  
%include "&cur_folder.data.sas";
```

Style 1

```
body{
  font-family: "Courier New";
  font-size: 9px;
}
.table{
  border-top: 1px solid black;
  border-bottom: 1px solid black;
  border-left: 0px none;
  border-right: 0px none;
  border-collapse: collapse;
}
.header{
  font-weight: normal;
  border-top: 0px none;
  border-bottom: 1px solid black;
  border-left: 0px none;
  border-right: 0px none;
}
```

Style 2

```
body, .data, .header, .systemtitle, .systemtitle2{  
  font-family: Helvetica, sans-serif;  
  font-size: 14px;  
}  
  
.table{  
  border-top: 1px solid blue;  
  border-bottom: 1px solid blue;  
  border-left: 1px solid blue;  
  border-right: 1px solid blue;  
  border-collapse: collapse;  
}  
  
.header{  
  font-weight: bold;  
  border-top: 1px solid blue;  
  border-bottom: 1px solid blue;  
  border-left: 1px solid blue;  
  border-right: 1px solid blue;  
  background-color: cadetblue;  
}
```

Show time