15 MINUTE

sas

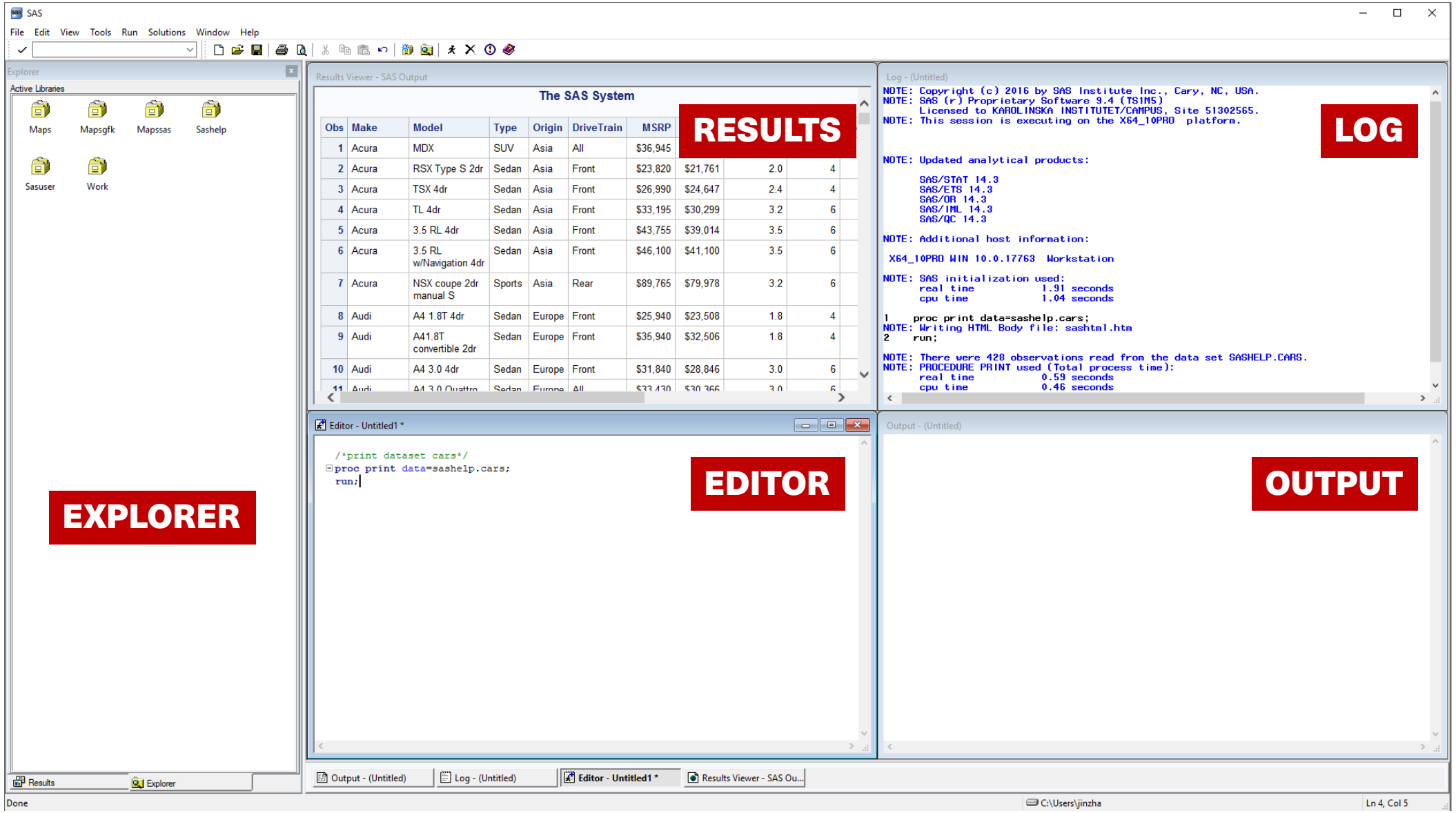
CONCEPTUAL INTRODUCTION TO SAS

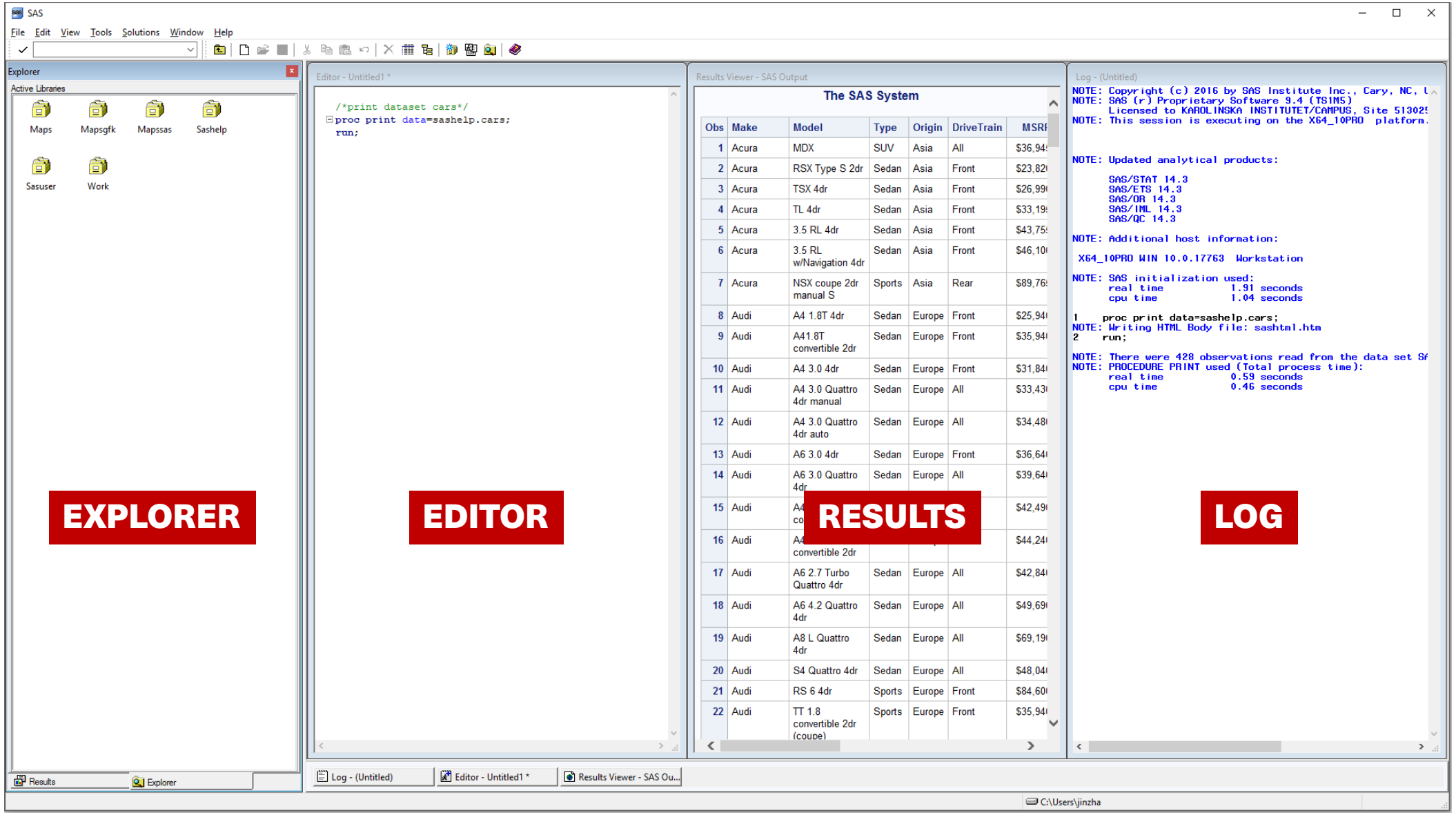
1 minute	Why SAS
1 minute	SAS Windows
8 minutes	10 SAS Concepts
5 minutes	SAS live

Top 3 SAS features

1. SQL + SAS = All-in-one data management
2. Syntax reads (almost) like English
3. Robust and backwards compatible

SAS WINDOWS


SAS
File Edit View Tools Run Solutions Window Help
Explorer
Active Libraries
Maps
Mapsgfk
Mapssas
Sashelp
Sasuser
Work
EXPLORER
Results
Explorer
Results Viewer - SAS Output
The SAS System
RESULTS
Obs Make Model Type Origin DriveTrain MSRP
1 Acura MDX SUV Asia All $36,945
2 Acura RSX Type S 2dr Sedan Asia Front $23,820 $21,761 2.0 4
3 Acura TSX 4dr Sedan Asia Front $26,990 $24,647 2.4 4
4 Acura TL 4dr Sedan Asia Front $33,195 $30,299 3.2 6
5 Acura 3.5 RL 4dr Sedan Asia Front $43,755 $39,014 3.5 6
6 Acura 3.5 RL w/Navigation 4dr Sedan Asia Front $46,100 $41,100 3.5 6
7 Acura NSX coupe 2dr manual S Sports Asia Rear $89,765 $79,978 3.2 6
8 Audi A4 1.8T 4dr Sedan Europe Front $25,940 $23,508 1.8 4
9 Audi A41.8T convertible 2dr Sedan Europe Front $35,940 $32,506 1.8 4
10 Audi A4 3.0 4dr Sedan Europe Front $31,840 $28,846 3.0 6
Log - (Untitled)
LOG
NOTE: Copyright (c) 2016 by SAS Institute Inc., Cary, NC, USA.
NOTE: SAS (r) Proprietary Software 9.4 (TS1M5)
Licensed to KAROLINSKA INSTITUTET/CAMPUS, Site 51302565.
NOTE: This session is executing on the X64_10PRO platform.
NOTE: Updated analytical products:
SAS/STAT 14.3
SAS/ETS 14.3
SAS/OR 14.3
SAS/IML 14.3
SAS/QC 14.3
NOTE: Additional host information:
X64_10PRO WIN 10.0.17763 Workstation
NOTE: SAS initialization used:
real time 1.91 seconds
cpu time 1.04 seconds
1 proc print data=sashelp.cars;
NOTE: Writing HTML Body file: sashtml.htm
2 run;
NOTE: There were 428 observations read from the data set SASHELP.CARS.
NOTE: PROCEDURE PRINT used (Total process time):
real time 0.59 seconds
cpu time 0.46 seconds
Editor - Untitled1 *
/*print dataset cars*/
proc print data=sashelp.cars;
run;
EDITOR
Output - (Untitled)
OUTPUT
Output - (Untitled)
Log - (Untitled)
Editor - Untitled1 *
Results Viewer - SAS Ou...
Done
C:\Users\jinzha
Ln 4, Col 5

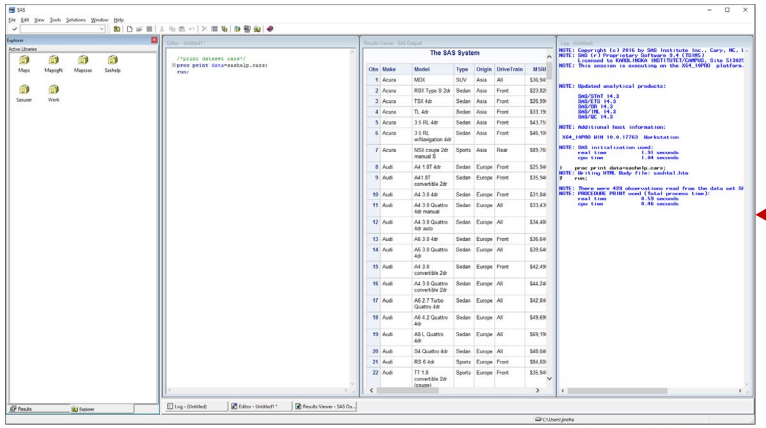

SAS
File Edit View Tools Solutions Window Help
Explorer
Active Libraries
Maps
Mapsgfk
Mapssas
Sashelp
Sasuser
Work
Results
Explorer
EXPLORER
Editor - Untitled1 *
/*print dataset cars*/
proc print data=sashelp.cars;
run;
EDITOR
Results Viewer - SAS Output
The SAS System
Obs Make Model Type Origin DriveTrain MSRP
1 Acura MDX SUV Asia All $36,945
2 Acura RSX Type S 2dr Sedan Asia Front $23,820
3 Acura TSX 4dr Sedan Asia Front $26,990
4 Acura TL 4dr Sedan Asia Front $33,195
5 Acura 3.5 RL 4dr Sedan Asia Front $43,755
6 Acura 3.5 RL w/Navigation 4dr Sedan Asia Front $46,100
7 Acura NSX coupe 2dr manual S Sports Asia Rear $89,765
8 Audi A4 1.8T 4dr Sedan Europe Front $25,940
9 Audi A4 1.8T convertible 2dr Sedan Europe Front $35,940
10 Audi A4 3.0 4dr Sedan Europe Front $31,840
11 Audi A4 3.0 Quattro 4dr manual Sedan Europe All $33,430
12 Audi A4 3.0 Quattro 4dr auto Sedan Europe All $34,480
13 Audi A6 3.0 4dr Sedan Europe Front $36,640
14 Audi A6 3.0 Quattro 4dr Sedan Europe All $39,640
15 Audi A4 $42,490
16 Audi A4 convertible 2dr $44,240
17 Audi A6 2.7 Turbo Quattro 4dr Sedan Europe All $42,840
18 Audi A6 4.2 Quattro 4dr Sedan Europe All $49,690
19 Audi A8 L Quattro 4dr Sedan Europe All $69,190
20 Audi S4 Quattro 4dr Sedan Europe All $48,040
21 Audi RS 6 4dr Sports Europe Front $84,600
22 Audi TT 1.8 convertible 2dr (coupe) Sports Europe Front $35,940
RESULTS
Log - (Untitled)
NOTE: Copyright (c) 2016 by SAS Institute Inc., Cary, NC, U
NOTE: SAS (r) Proprietary Software 9.4 (TSIM5)
Licensed to KAROLINSKA INSTITUTET/CAMPUS, Site 513025
NOTE: This session is executing on the X64_10PRO platform.
NOTE: Updated analytical products:
SAS/STAT 14.3
SAS/ETS 14.3
SAS/OR 14.3
SAS/IML 14.3
SAS/QC 14.3
NOTE: Additional host information:
X64_10PRO WIN 10.0.17763 Workstation
NOTE: SAS initialization used:
real time 1.91 seconds
cpu time 1.04 seconds
1 proc print data=sashelp.cars;
NOTE: Writing HTML Body file: sashtml.htm
2 run;
NOTE: There were 428 observations read from the data set SA
NOTE: PROCEDURE PRINT used (Total process time):
real time 0.59 seconds
cpu time 0.46 seconds
LOG
Log - (Untitled)
Editor - Untitled1 *
Results Viewer - SAS Ou...
C:\Users\jinzha

SAS CONCEPTS

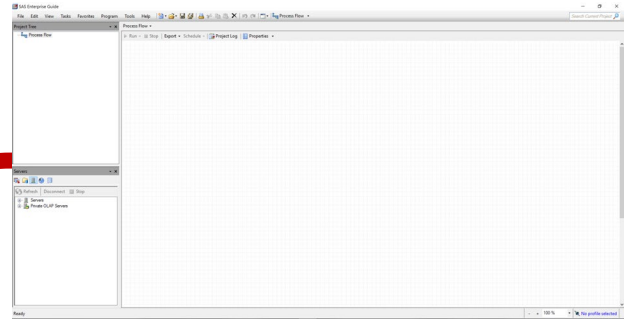
SAS CONCEPTS

#1 SAS IDEs

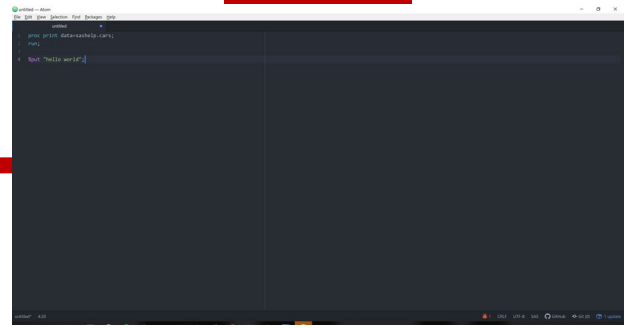
BASE SAS



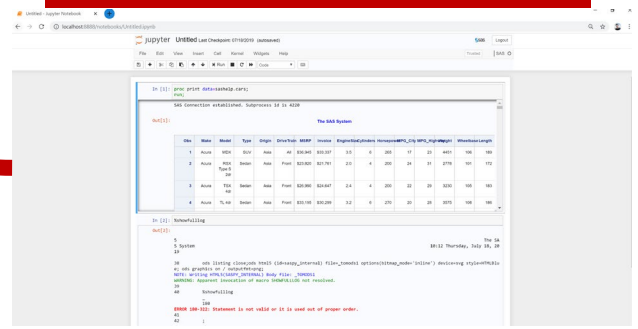
SAS ENTERPRISE GUIDE



ATOM

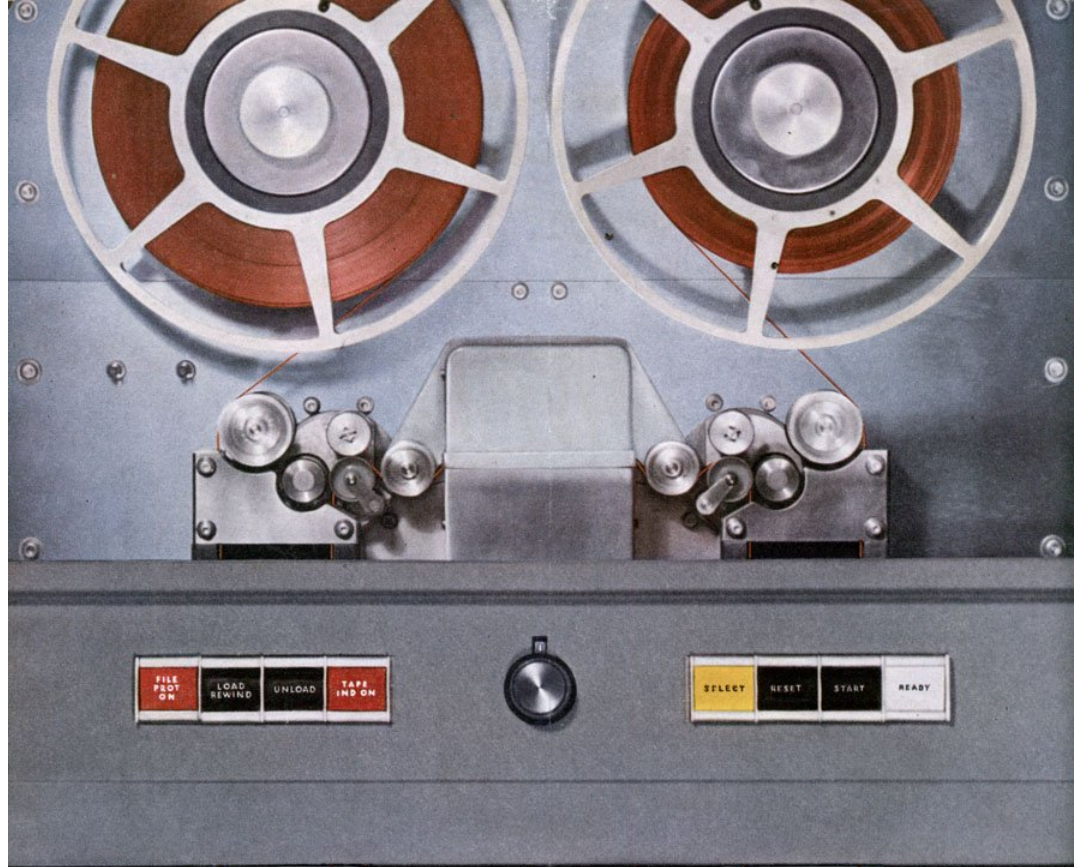


JUPYTER NOTEBOOK



SAS CONCEPTS

#2 SAS-logic is “row-by-row”



A "Giant Brain" that's Strictly Business

IBM's new 702 Electronic Data Processing Machine brings to the accounting and record-keeping problems of business the speed and capacity of giant scientific computers.

It can absorb millions of facts and figures on its magnetic tapes (shown here), process this vast quantity of data, and turn out the results in the form you need. Payrolls, billing, manufacturing and inventory control, cost allocation, manpower scheduling, fiscal accounting—all the complex operations of modern business—are performed at high speed.

This is *business* automation at its highest development.

International Business Machines
590 Madison Avenue, New York 22, N. Y.

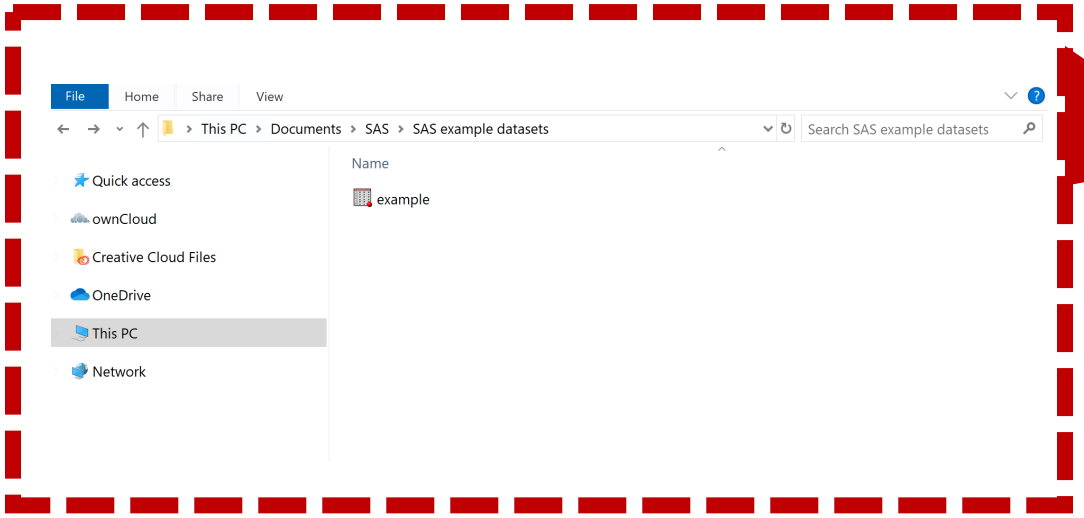
IBM
TRADE MARK

World's Leading Producer of Electronic Accounting Machines

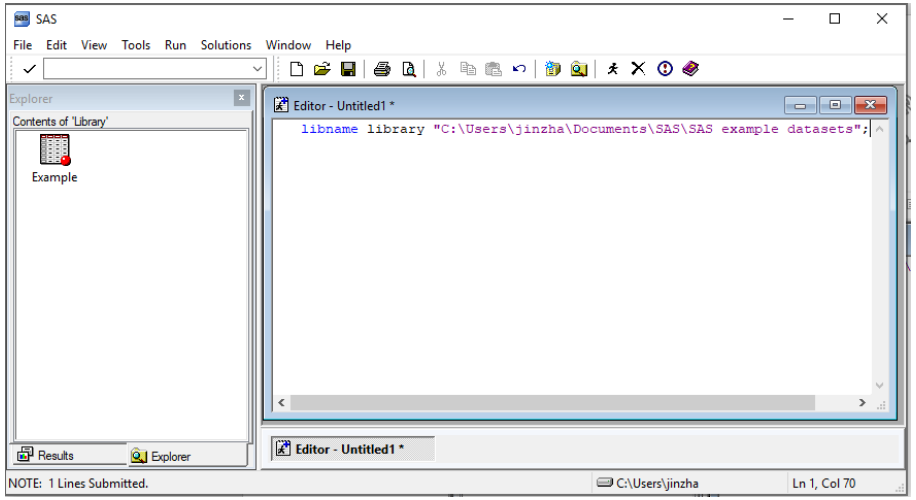
SAS CONCEPTS

#3 You don’t load datafiles into memory

PHYSICAL FOLDER



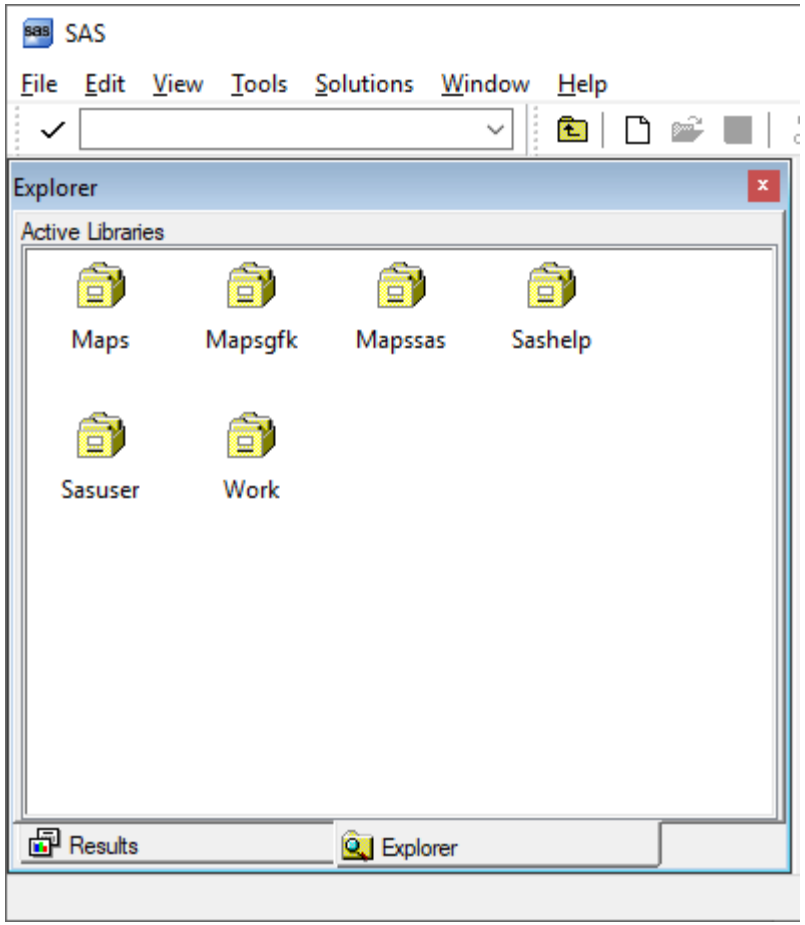
BASE SAS



SAS CONCEPTS

#3 Work Folder

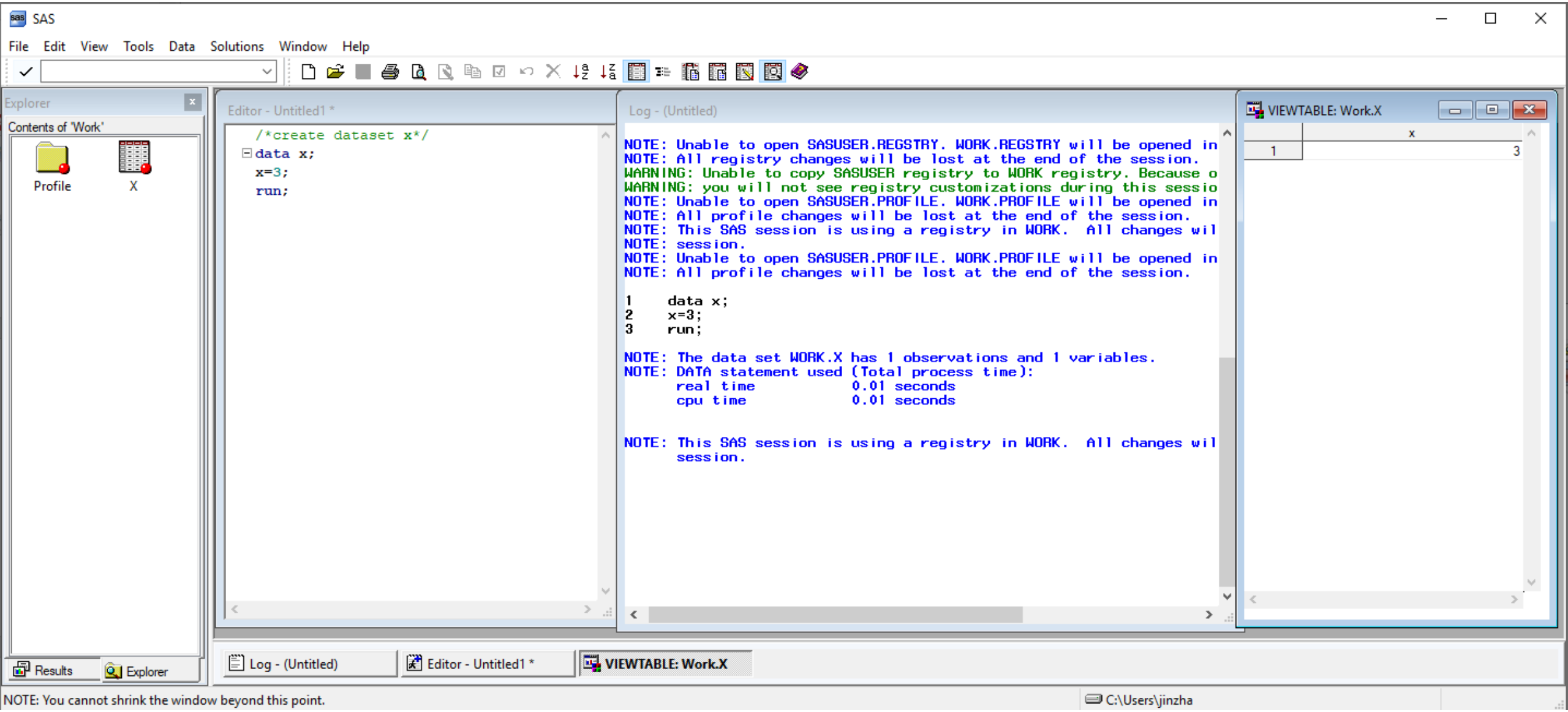
#3 Work Folder

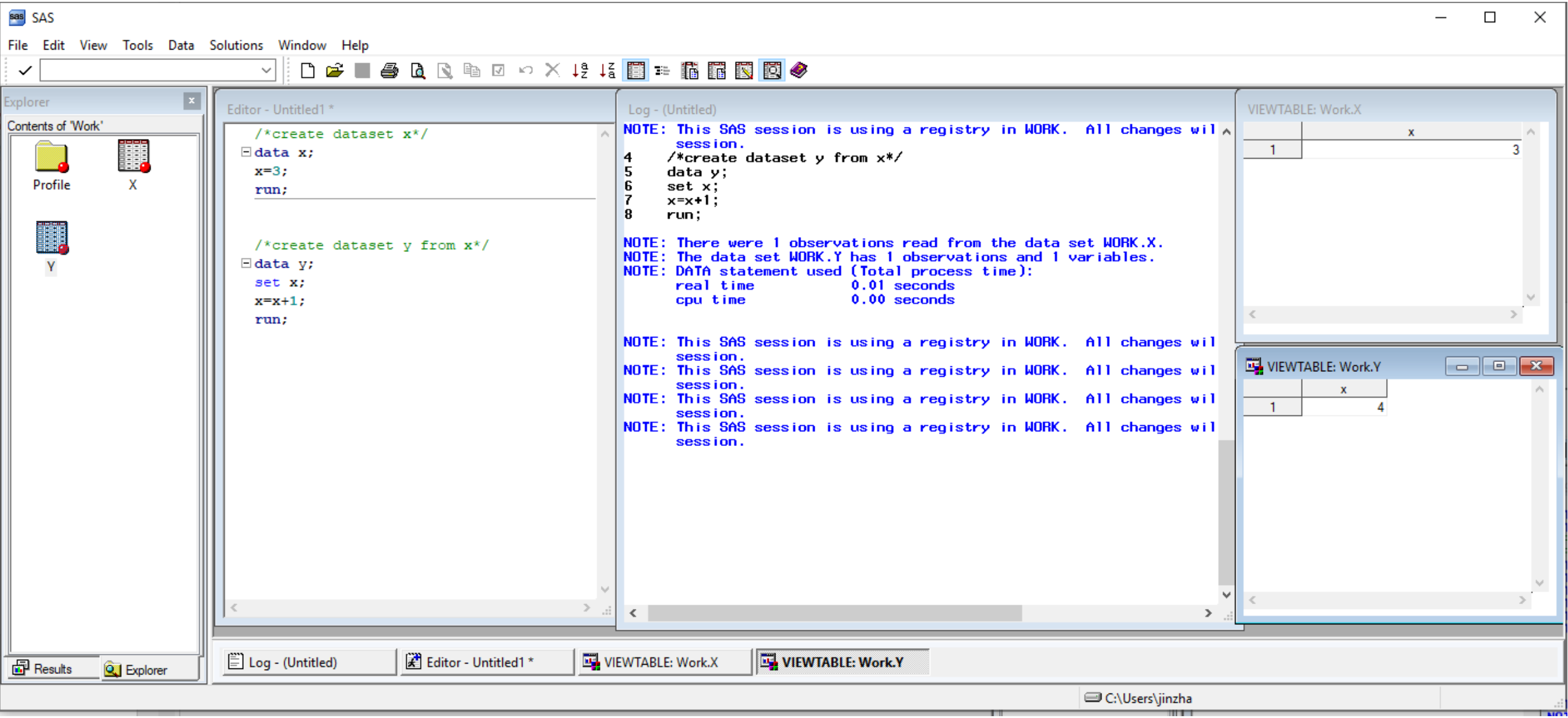


- Temporary folder (deletes after each session)
- By default datasets are created in work folder

SAS CONCEPTS

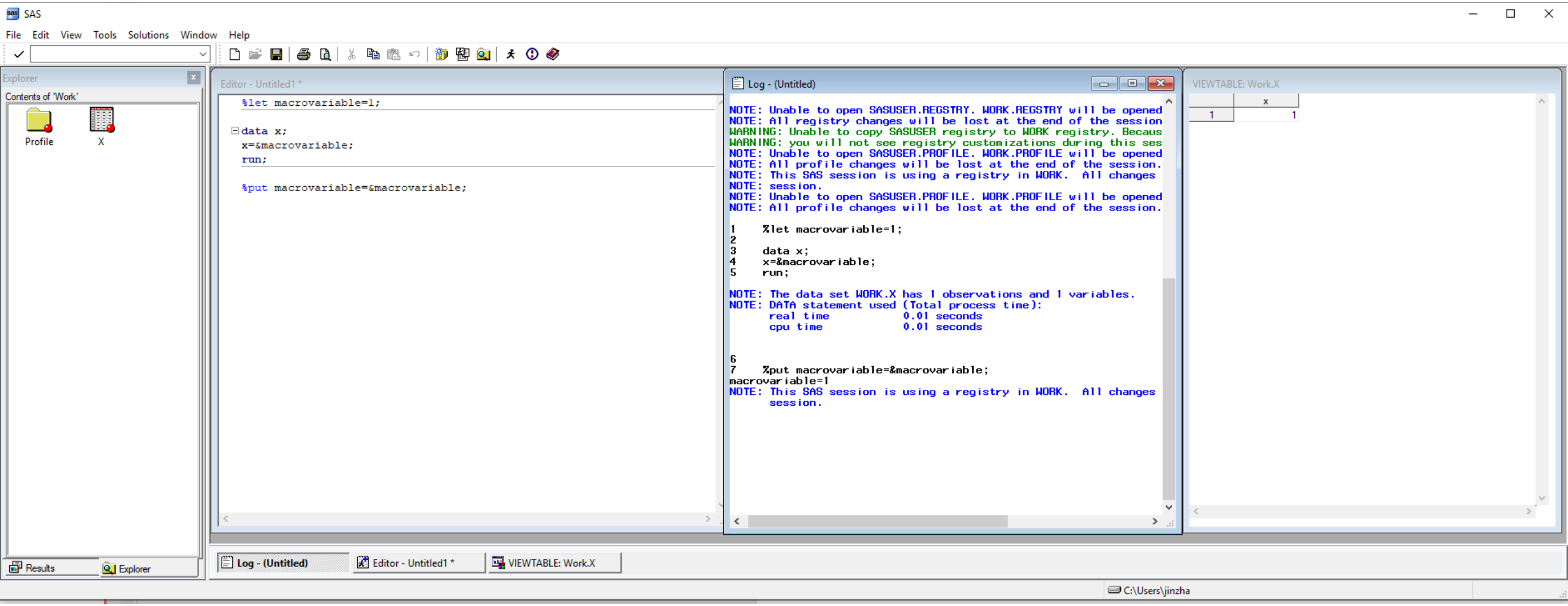
#4 Datasets

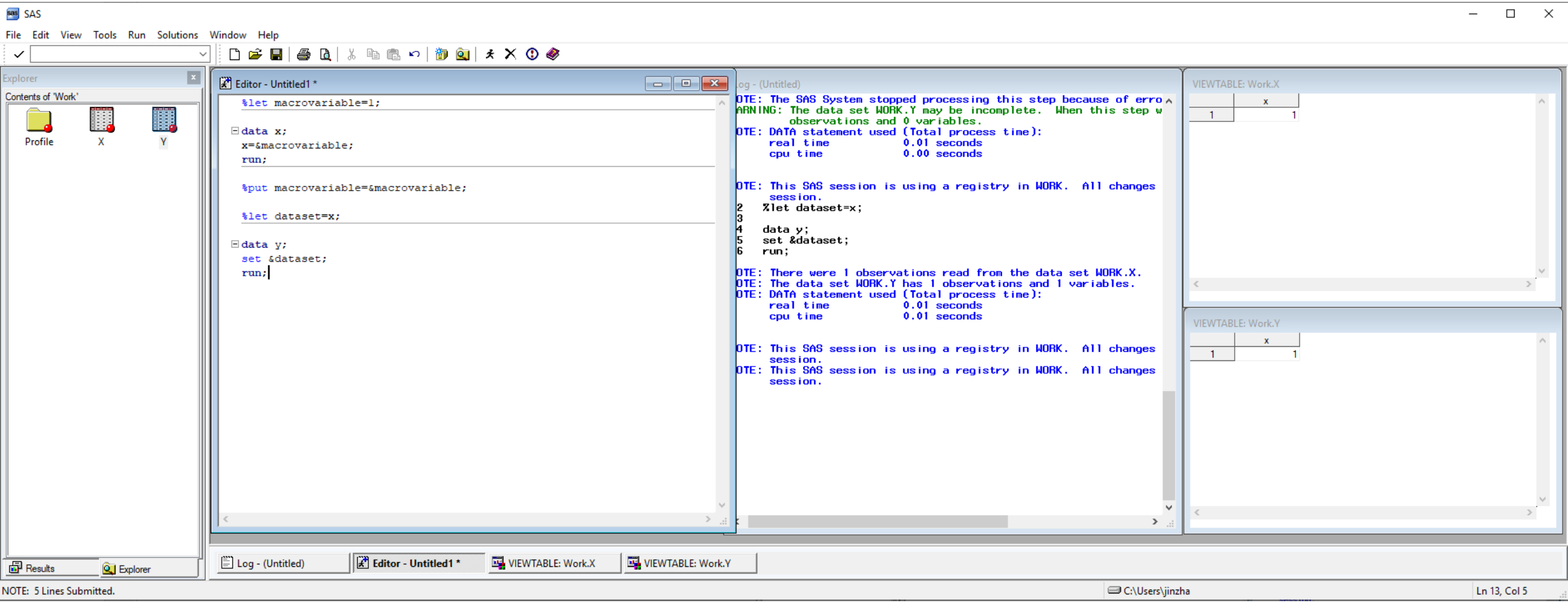

SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Editor - Untitled1 *
/*create dataset x*/
data x;
x=3;
run;
Log - (Untitled)
NOTE: Unable to open SASUSER.REGSTRY. WORK.REGSTRY will be opened in
NOTE: All registry changes will be lost at the end of the session.
WARNING: Unable to copy SASUSER registry to WORK registry. Because o
WARNING: you will not see registry customizations during this sessio
NOTE: Unable to open SASUSER.PROFILE. WORK.PROFILE will be opened in
NOTE: All profile changes will be lost at the end of the session.
NOTE: This SAS session is using a registry in WORK. All changes wil
NOTE: session.
NOTE: Unable to open SASUSER.PROFILE. WORK.PROFILE will be opened in
NOTE: All profile changes will be lost at the end of the session.
1 data x;
2 x=3;
3 run;
NOTE: The data set WORK.X has 1 observations and 1 variables.
NOTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.01 seconds
NOTE: This SAS session is using a registry in WORK. All changes wil
session.
VIEWTABLE: Work.X
x
1
3
Results
Explorer
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
NOTE: You cannot shrink the window beyond this point.
C:\Users\jinzha


SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Y
Results
Explorer
Editor - Untitled1 *
/*create dataset x*/
data x;
x=3;
run;
/*create dataset y from x*/
data y;
set x;
x=x+1;
run;
Log - (Untitled)
NOTE: This SAS session is using a registry in WORK. All changes wil
session.
4 /*create dataset y from x*/
5 data y;
6 set x;
7 x=x+1;
8 run;
NOTE: There were 1 observations read from the data set WORK.X.
NOTE: The data set WORK.Y has 1 observations and 1 variables.
NOTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.00 seconds
NOTE: This SAS session is using a registry in WORK. All changes wil
session.
NOTE: This SAS session is using a registry in WORK. All changes wil
session.
NOTE: This SAS session is using a registry in WORK. All changes wil
session.
NOTE: This SAS session is using a registry in WORK. All changes wil
session.
VIEWTABLE: Work.X
x
1 3
VIEWTABLE: Work.Y
x
1 4
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.Y
C:\Users\jinzha

SAS CONCEPTS

#5 Macro Variables


SAS
File Edit View Tools Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Results
Explorer
Editor - Untitled1 *
%let macrovariable=1;
data x;
x=&macrovariable;
run;
%put macrovariable=&macrovariable;
Log - (Untitled)
NOTE: Unable to open SASUSER.REGSTRY. WORK.REGSTRY will be opened
NOTE: All registry changes will be lost at the end of the session
WARNING: Unable to copy SASUSER registry to WORK registry. Becaus
WARNING: you will not see registry customizations during this ses
NOTE: Unable to open SASUSER.PROFILE. WORK.PROFILE will be opened
NOTE: All profile changes will be lost at the end of the session.
NOTE: This SAS session is using a registry in WORK. All changes
NOTE: session.
NOTE: Unable to open SASUSER.PROFILE. WORK.PROFILE will be opened
NOTE: All profile changes will be lost at the end of the session.
1 %let macrovariable=1;
2
3 data x;
4 x=&macrovariable;
5 run;
NOTE: The data set WORK.X has 1 observations and 1 variables.
NOTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.01 seconds
6
7 %put macrovariable=&macrovariable;
macrovariable=1
NOTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
x
1 1
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
C:\Users\jinzha


SAS
File Edit View Tools Run Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Y
Results
Explorer
Editor - Untitled1 *
%let macrovariable=1;
data x;
x=&macrovariable;
run;
%put macrovariable=&macrovariable;
%let dataset=x;
data y;
set &dataset;
run;
Log - (Untitled)
OTE: The SAS System stopped processing this step because of erro
ARNING: The data set WORK.Y may be incomplete. When this step w
observations and 0 variables.
OTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.00 seconds
OTE: This SAS session is using a registry in WORK. All changes
session.
2 %let dataset=x;
3
4 data y;
5 set &dataset;
6 run;
OTE: There were 1 observations read from the data set WORK.X.
OTE: The data set WORK.Y has 1 observations and 1 variables.
OTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.01 seconds
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
x
1 1
VIEWTABLE: Work.Y
x
1 1
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.Y
NOTE: 5 Lines Submitted.
C:\Users\jinzha
Ln 13, Col 5

SAS CONCEPTS

#6 Variable Types

Only 2 variable types

Character

String variables

Numerical

Floats and Integers

Thousands of built-in formats

Character

Varying lengths
$customformats.

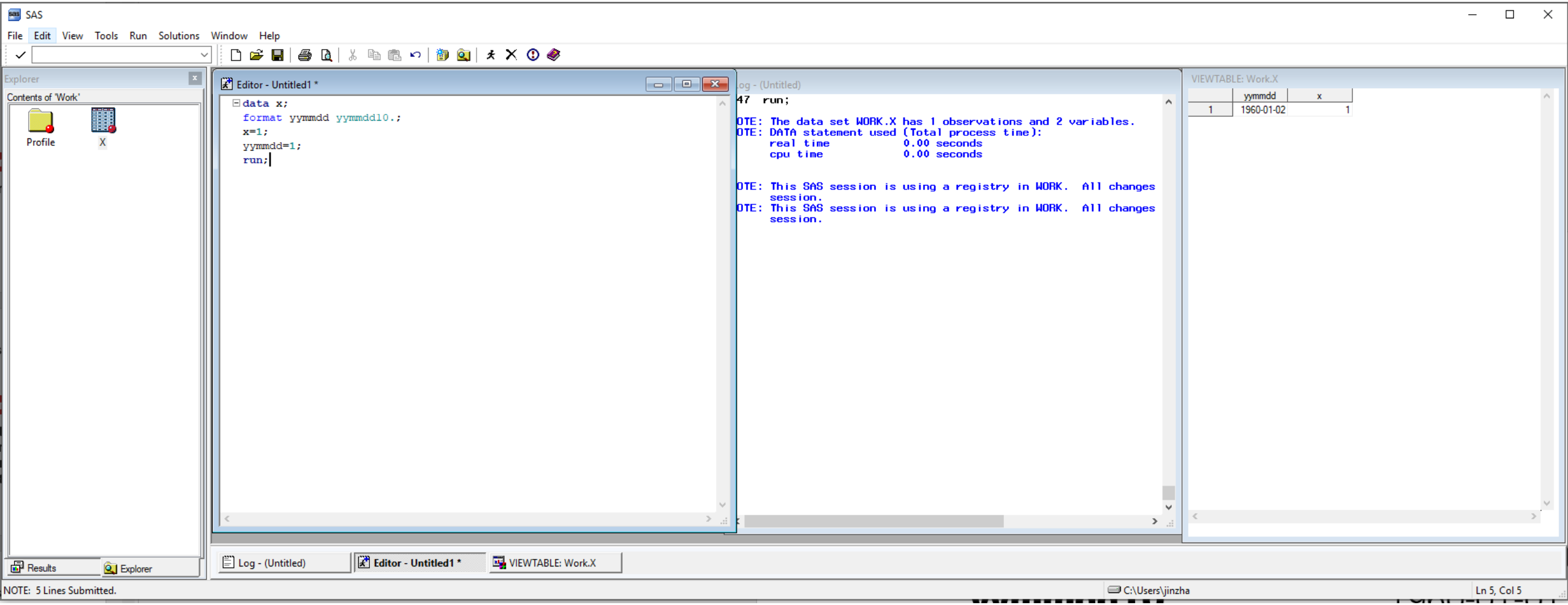
Numerical

datetime20.
yymmdd10.
hhmm5.
8.2

Thousands of built-in formats

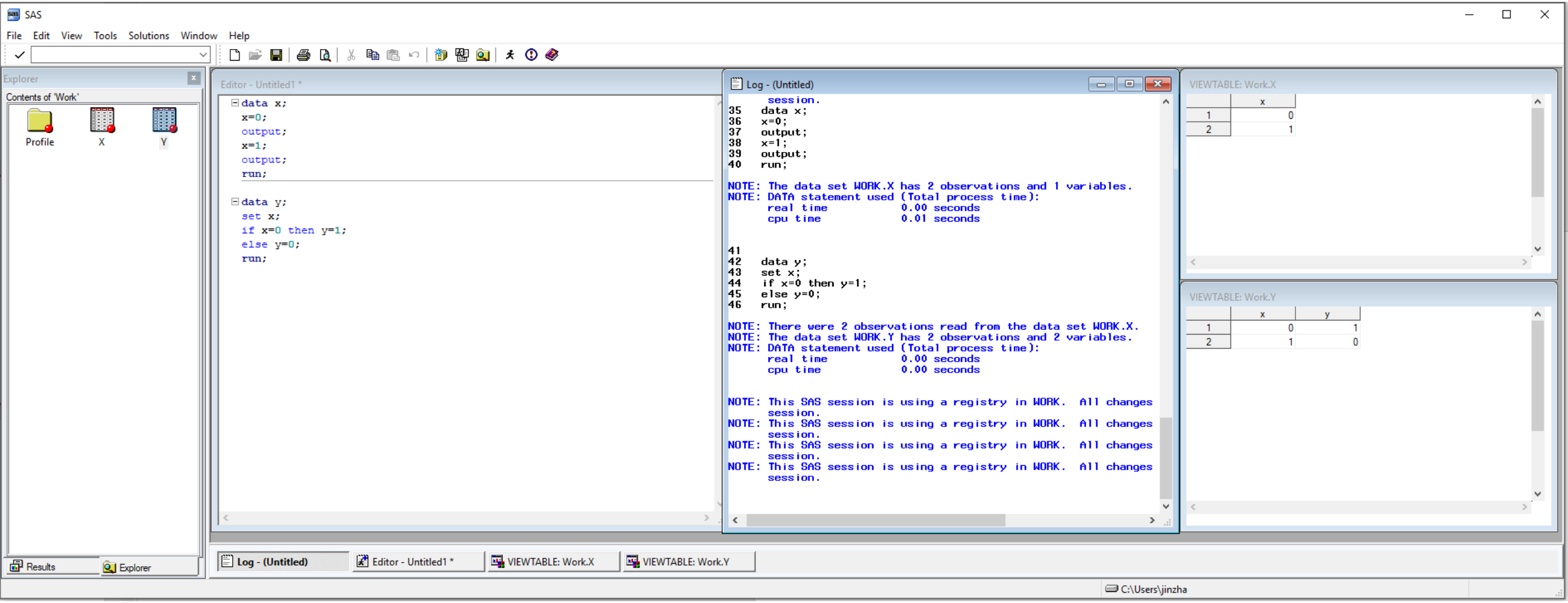
Numerical

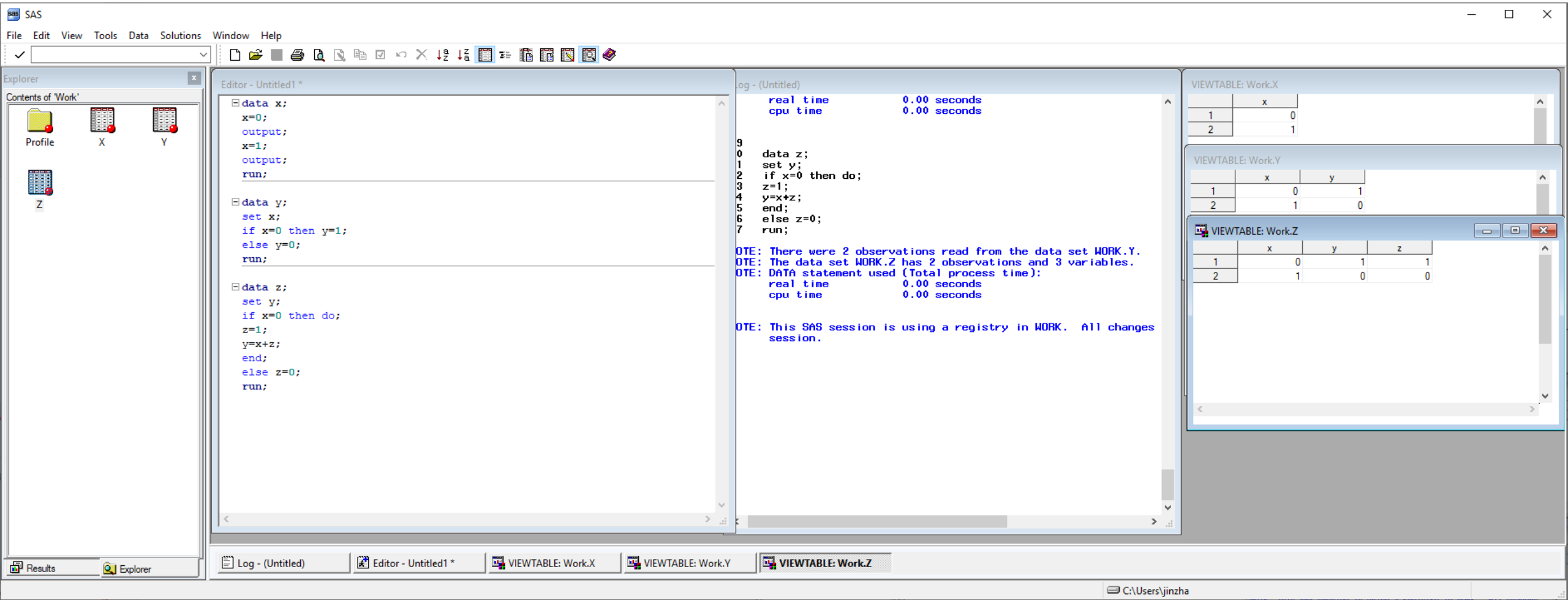
datetime20.	02JAN1960:06:00:00
yymmdd10.	1960-01-02
hhmm5.	06:00
8.2	1.00


SAS
File Edit View Tools Run Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Results
Explorer
Editor - Untitled1 *
data x;
format yymmdd yymmdd10.;
x=1;
yymmdd=1;
run;
Log - (Untitled)
47 run;
OTE: The data set WORK.X has 1 observations and 2 variables.
OTE: DATA statement used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
yymmdd x
1 1960-01-02 1
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
NOTE: 5 Lines Submitted.
C:\Users\jinzha
Ln 5, Col 5

SAS CONCEPTS

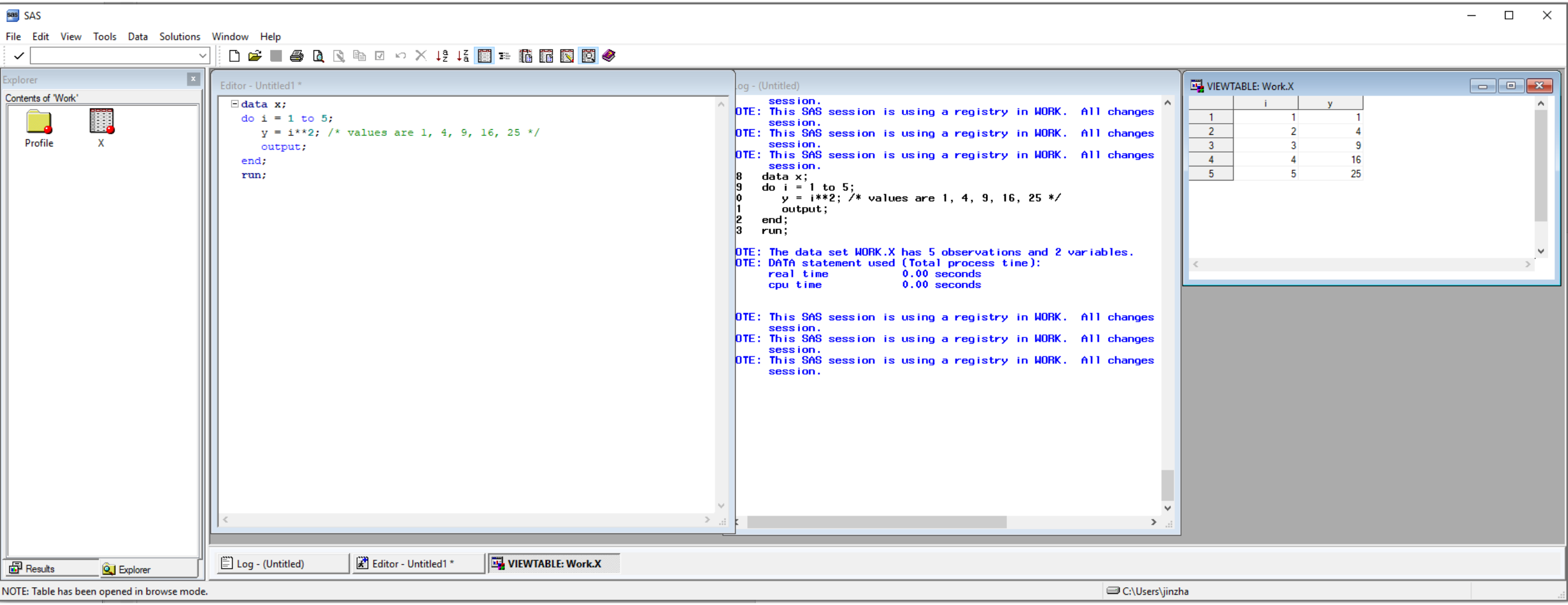
#7 If-then clauses

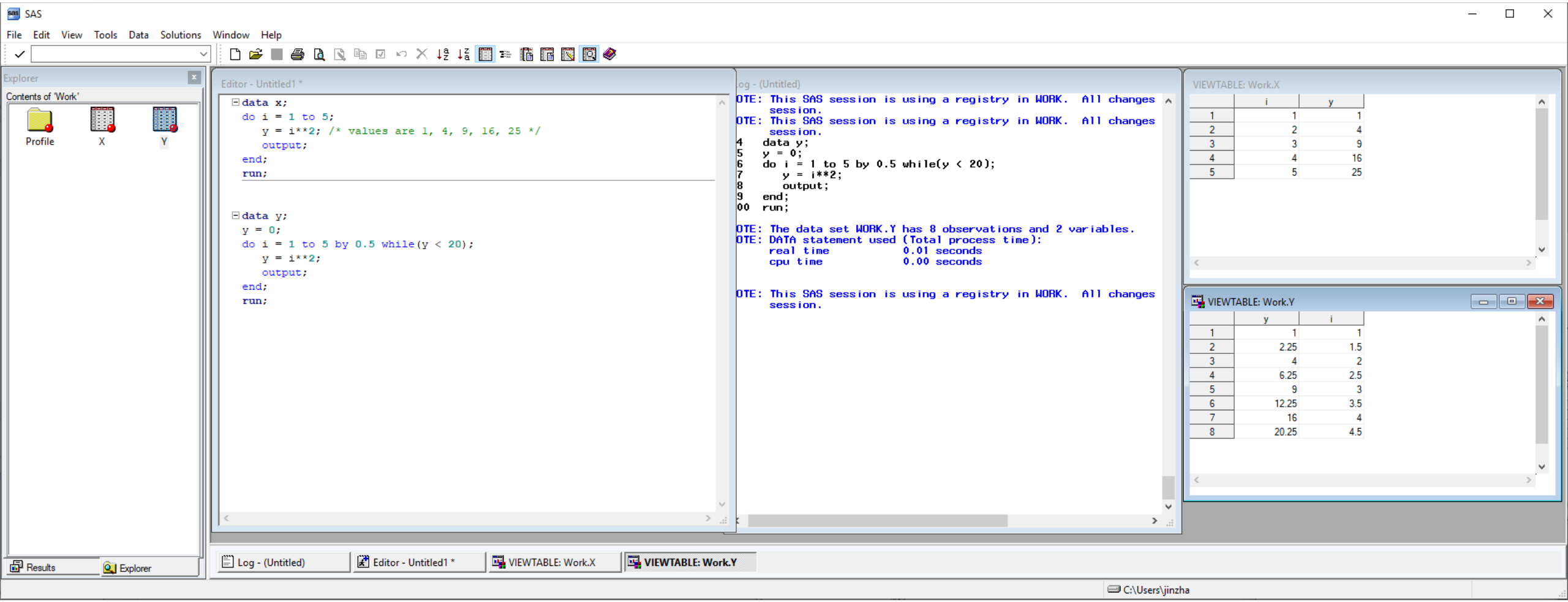

SAS
File Edit View Tools Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Y
Results
Explorer
Editor - Untitled1 *
data x;
x=0;
output;
x=1;
output;
run;
data y;
set x;
if x=0 then y=1;
else y=0;
run;
Log - (Untitled)
session.
35 data x;
36 x=0;
37 output;
38 x=1;
39 output;
40 run;
NOTE: The data set WORK.X has 2 observations and 1 variables.
NOTE: DATA statement used (Total process time):
real time 0.00 seconds
cpu time 0.01 seconds
41
42 data y;
43 set x;
44 if x=0 then y=1;
45 else y=0;
46 run;
NOTE: There were 2 observations read from the data set WORK.X.
NOTE: The data set WORK.Y has 2 observations and 2 variables.
NOTE: DATA statement used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
NOTE: This SAS session is using a registry in WORK. All changes
session.
NOTE: This SAS session is using a registry in WORK. All changes
session.
NOTE: This SAS session is using a registry in WORK. All changes
session.
NOTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
x
1 0
2 1
VIEWTABLE: Work.Y
x y
1 0 1
2 1 0
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.Y
C:\Users\jinzha

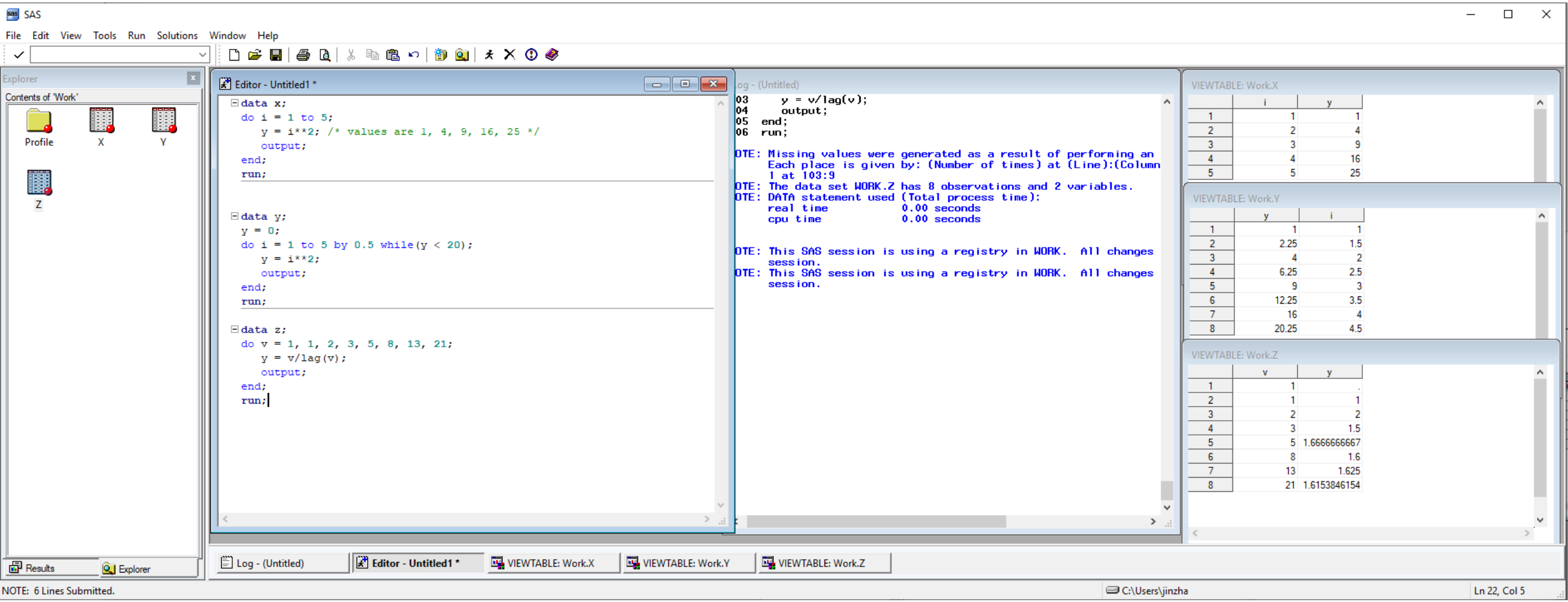

SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Y
Z
Results
Explorer
Editor - Untitled1 *
data x;
x=0;
output;
x=1;
output;
run;
data y;
set x;
if x=0 then y=1;
else y=0;
run;
data z;
set y;
if x=0 then do;
z=1;
y=x+z;
end;
else z=0;
run;
Log - (Untitled)
real time 0.00 seconds
cpu time 0.00 seconds
9
0 data z;
1 set y;
2 if x=0 then do;
3 z=1;
4 y=x+z;
5 end;
6 else z=0;
7 run;
OTE: There were 2 observations read from the data set WORK.Y.
OTE: The data set WORK.Z has 2 observations and 3 variables.
OTE: DATA statement used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
OTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
x
1 0
2 1
VIEWTABLE: Work.Y
x y
1 0 1
2 1 0
VIEWTABLE: Work.Z
x y z
1 0 1 1
2 1 0 0
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.Y
VIEWTABLE: Work.Z
C:\Users\jinzha

SAS CONCEPTS

#8 Loops


SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Results
Explorer
Editor - Untitled1 *
data x;
do i = 1 to 5;
y = i**2; /* values are 1, 4, 9, 16, 25 */
output;
end;
run;
Log - (Untitled)
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
8 data x;
9 do i = 1 to 5;
0 y = i**2; /* values are 1, 4, 9, 16, 25 */
1 output;
2 end;
3 run;
OTE: The data set WORK.X has 5 observations and 2 variables.
OTE: DATA statement used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
i y
1 1 1
2 2 4
3 3 9
4 4 16
5 5 25
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
NOTE: Table has been opened in browse mode.
C:\Users\jinzha


SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
Profile
X
Y
Results
Explorer
Editor - Untitled1 *
data x;
do i = 1 to 5;
y = i**2; /* values are 1, 4, 9, 16, 25 */
output;
end;
run;
data y;
y = 0;
do i = 1 to 5 by 0.5 while(y < 20);
y = i**2;
output;
end;
run;
Log - (Untitled)
OTE: This SAS session is using a registry in WORK. All changes
session.
OTE: This SAS session is using a registry in WORK. All changes
session.
4 data y;
5 y = 0;
6 do i = 1 to 5 by 0.5 while(y < 20);
7 y = i**2;
8 output;
9 end;
00 run;
OTE: The data set WORK.Y has 8 observations and 2 variables.
OTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.00 seconds
OTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
i y
1 1 1
2 2 4
3 3 9
4 4 16
5 5 25
VIEWTABLE: Work.Y
y i
1 1 1
2 2.25 1.5
3 4 2
4 6.25 2.5
5 9 3
6 12.25 3.5
7 16 4
8 20.25 4.5
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.Y
C:\Users\jinzha



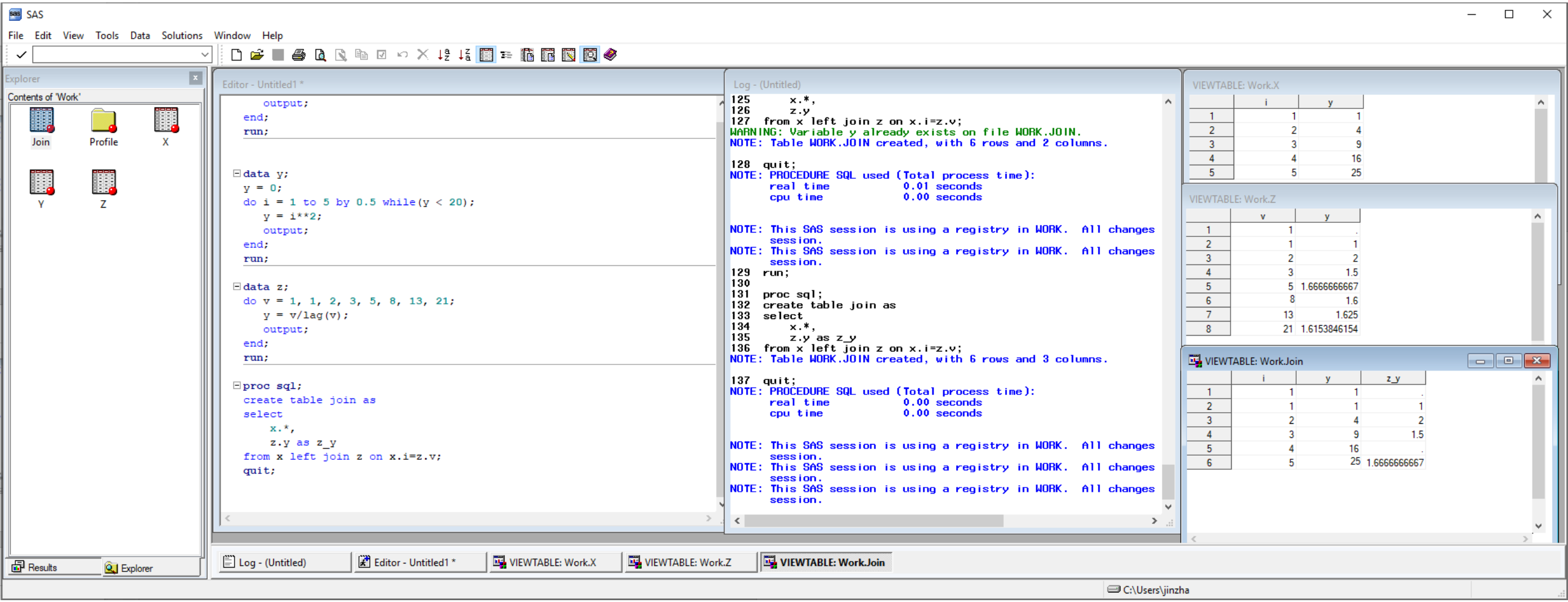
	i	y
1	1	1
2	2	4
3	3	9
4	4	16
5	5	25

	y	i
1	1	1
2	2.25	1.5
3	4	2
4	6.25	2.5
5	9	3
6	12.25	3.5
7	16	4
8	20.25	4.5

	v	y
1	1	.
2	1	1
3	2	2
4	3	1.5
5	5	1.6666666667
6	8	1.6
7	13	1.625
8	21	1.6153846154

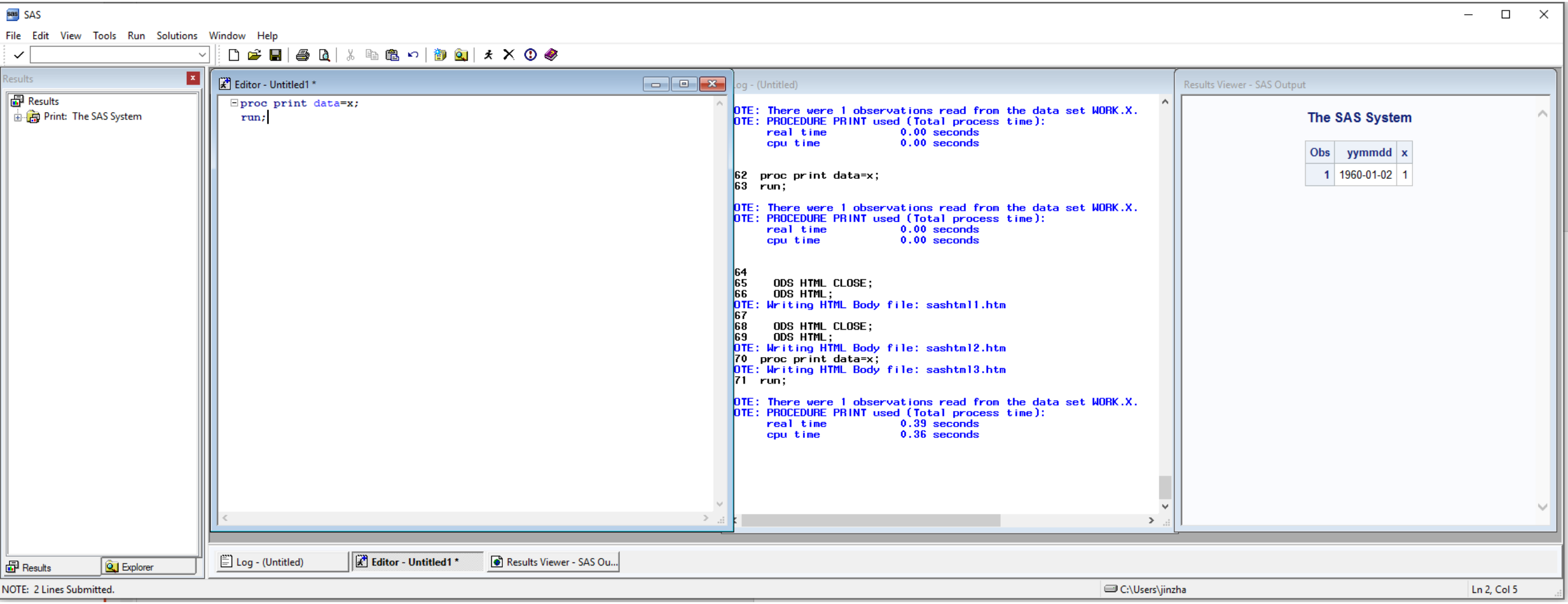
SAS CONCEPTS

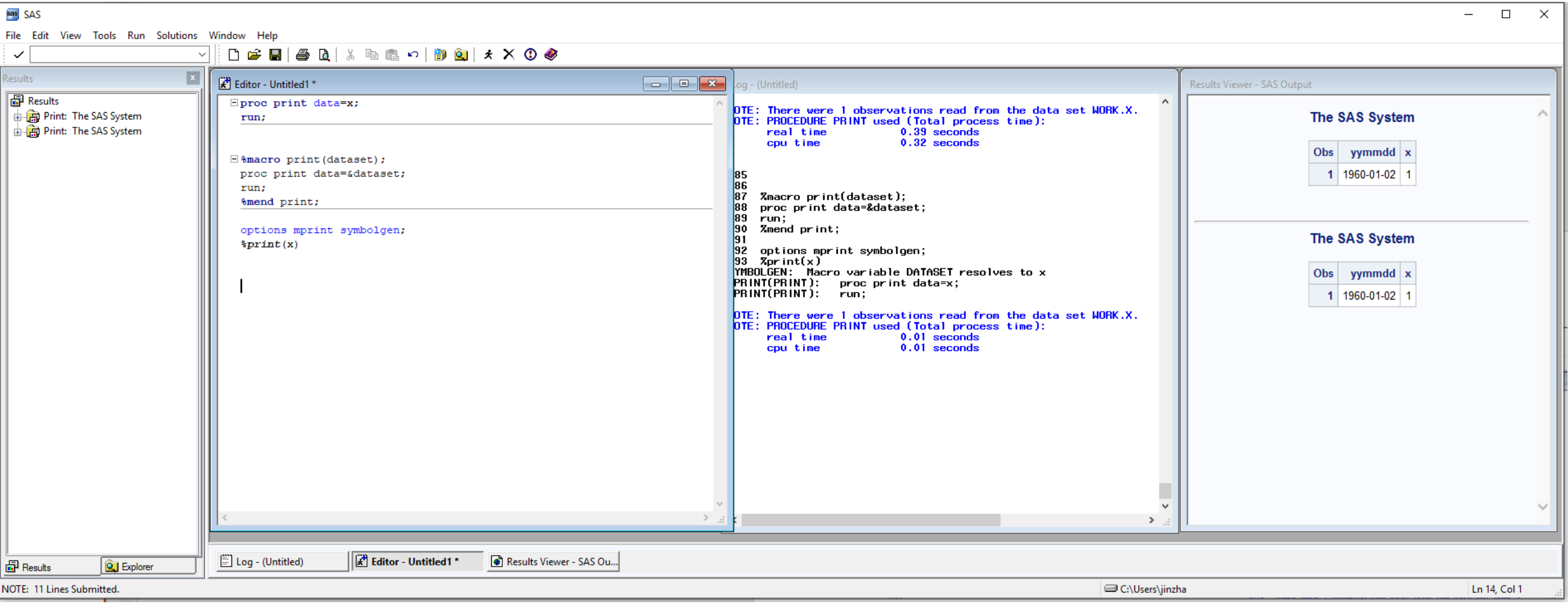
#9 Proc SQL


SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
Join
Profile
X
Y
Z
Results
Explorer
Editor - Untitled1 *
output;
end;
run;
data y;
y = 0;
do i = 1 to 5 by 0.5 while(y < 20);
y = i**2;
output;
end;
run;
data z;
do v = 1, 1, 2, 3, 5, 8, 13, 21;
y = v/lag(v);
output;
end;
run;
proc sql;
create table join as
select
x.*,
z.y as z_y
from x left join z on x.i=z.v;
quit;
Log - (Untitled)
125 x.*,
126 z.y
127 from x left join z on x.i=z.v;
WARNING: Variable y already exists on file WORK.JOIN.
NOTE: Table WORK.JOIN created, with 6 rows and 2 columns.
128 quit;
NOTE: PROCEDURE SQL used (Total process time):
real time 0.01 seconds
cpu time 0.00 seconds
NOTE: This SAS session is using a registry in WORK. All changes
session.
NOTE: This SAS session is using a registry in WORK. All changes
session.
129 run;
130
131 proc sql;
132 create table join as
133 select
134 x.*,
135 z.y as z_y
136 from x left join z on x.i=z.v;
NOTE: Table WORK.JOIN created, with 6 rows and 3 columns.
137 quit;
NOTE: PROCEDURE SQL used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
NOTE: This SAS session is using a registry in WORK. All changes
session.
NOTE: This SAS session is using a registry in WORK. All changes
session.
NOTE: This SAS session is using a registry in WORK. All changes
session.
VIEWTABLE: Work.X
i y
1 1 1
2 2 4
3 3 9
4 4 16
5 5 25
VIEWTABLE: Work.Z
v y
1 1 .
2 1 1
3 2 2
4 3 1.5
5 5 1.6666666667
6 8 1.6
7 13 1.625
8 21 1.6153846154
VIEWTABLE: Work.Join
i y z_y
1 1 1 .
2 1 1 1
3 2 4 2
4 3 9 1.5
5 4 16 .
6 5 25 1.6666666667
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.Z
VIEWTABLE: Work.Join
C:\Users\jinzha

SAS CONCEPTS

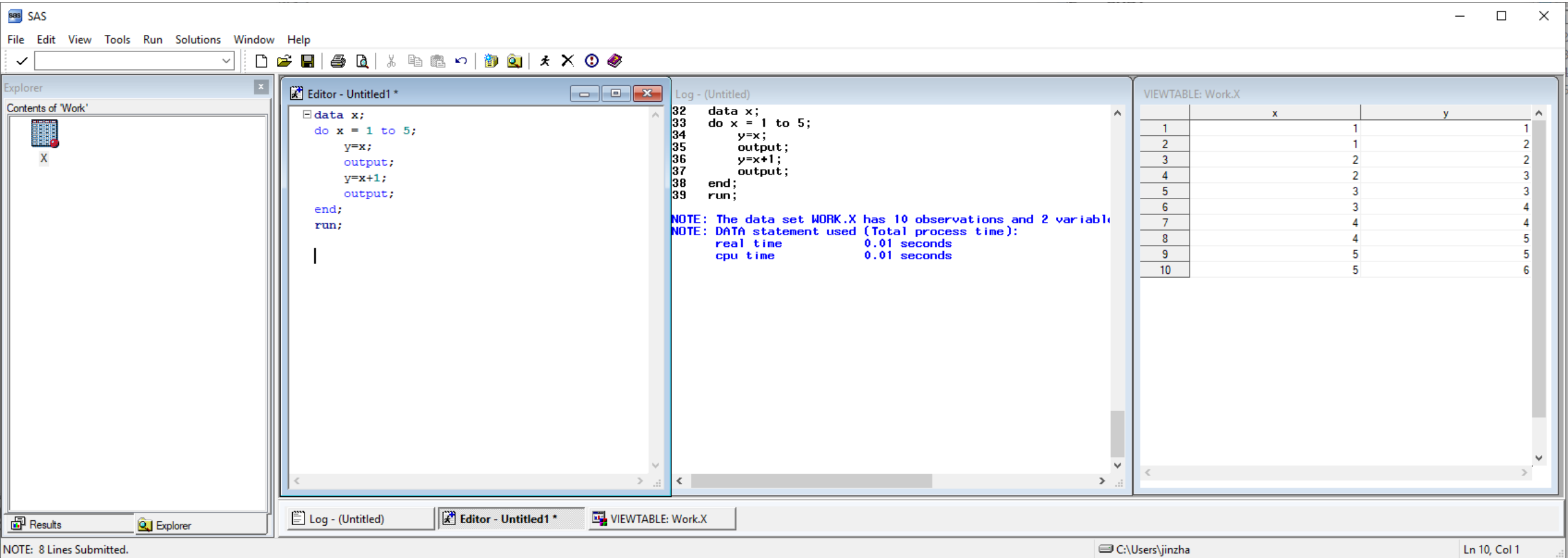
#10 Macros

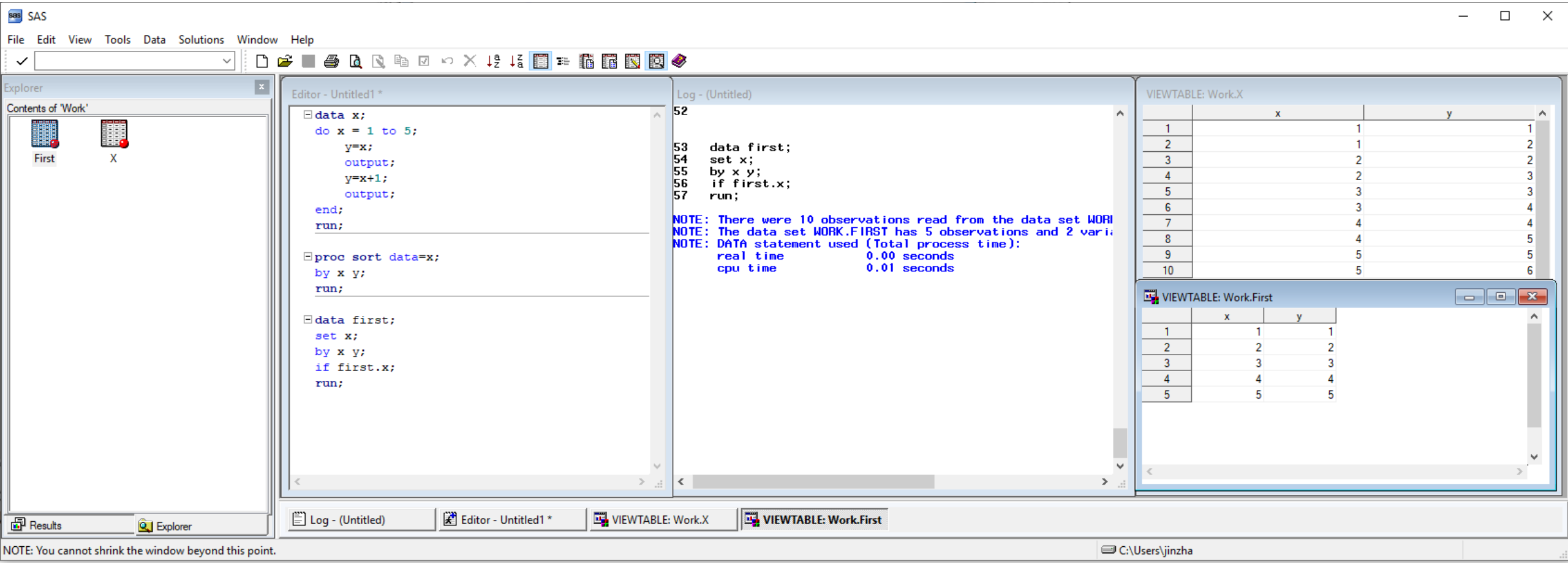

SAS
File Edit View Tools Run Solutions Window Help
Results
Results
Print: The SAS System
Results
Explorer
Editor - Untitled1 *
proc print data=x;
run;
Log - (Untitled)
OTE: There were 1 observations read from the data set WORK.X.
OTE: PROCEDURE PRINT used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
62 proc print data=x;
63 run;
OTE: There were 1 observations read from the data set WORK.X.
OTE: PROCEDURE PRINT used (Total process time):
real time 0.00 seconds
cpu time 0.00 seconds
64
65 ODS HTML CLOSE;
66 ODS HTML;
OTE: Writing HTML Body file: sashtml1.htm
67
68 ODS HTML CLOSE;
69 ODS HTML;
OTE: Writing HTML Body file: sashtml2.htm
70 proc print data=x;
OTE: Writing HTML Body file: sashtml3.htm
71 run;
OTE: There were 1 observations read from the data set WORK.X.
OTE: PROCEDURE PRINT used (Total process time):
real time 0.39 seconds
cpu time 0.36 seconds
Results Viewer - SAS Output
The SAS System
Obs yymmdd x
1 1960-01-02 1
Log - (Untitled)
Editor - Untitled1 *
Results Viewer - SAS Ou...
NOTE: 2 Lines Submitted.
C:\Users\jinzha
Ln 2, Col 5


SAS
File Edit View Tools Run Solutions Window Help
Results
Results
Print: The SAS System
Print: The SAS System
Editor - Untitled1 *
proc print data=x;
run;
%macro print(dataset);
proc print data=&dataset;
run;
%mend print;
options mprint symbolgen;
%print(x)
Log - (Untitled)
OTE: There were 1 observations read from the data set WORK.X.
OTE: PROCEDURE PRINT used (Total process time):
real time 0.39 seconds
cpu time 0.32 seconds
85
86
87 %macro print(dataset);
88 proc print data=&dataset;
89 run;
90 %mend print;
91
92 options mprint symbolgen;
93 %print(x)
YMBOLGEN: Macro variable DATASET resolves to x
PRINT(PRINT): proc print data=x;
PRINT(PRINT): run;
OTE: There were 1 observations read from the data set WORK.X.
OTE: PROCEDURE PRINT used (Total process time):
real time 0.01 seconds
cpu time 0.01 seconds
Results Viewer - SAS Output
The SAS System
Obs yymmdd x
1 1960-01-02 1
The SAS System
Obs yymmdd x
1 1960-01-02 1
Results
Explorer
Log - (Untitled)
Editor - Untitled1 *
Results Viewer - SAS Ou...
NOTE: 11 Lines Submitted.
C:\Users\jinzha
Ln 14, Col 1

SAS CONCEPTS

Bonus #1 Processing “BY-groups”


SAS
File Edit View Tools Run Solutions Window Help
Explorer
Contents of 'Work'
X
Results
Explorer
Editor - Untitled1 *
data x;
do x = 1 to 5;
y=x;
output;
y=x+1;
output;
end;
run;
Log - (Untitled)
32 data x;
33 do x = 1 to 5;
34 y=x;
35 output;
36 y=x+1;
37 output;
38 end;
39 run;
NOTE: The data set WORK.X has 10 observations and 2 variable
NOTE: DATA statement used (Total process time):
real time 0.01 seconds
cpu time 0.01 seconds
VIEWTABLE: Work.X
x y
1 1 1
2 1 2
3 2 2
4 2 3
5 3 3
6 3 4
7 4 4
8 4 5
9 5 5
10 5 6
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
NOTE: 8 Lines Submitted.
C:\Users\jinzha
Ln 10, Col 1


SAS
File Edit View Tools Data Solutions Window Help
Explorer
Contents of 'Work'
First
X
Results
Explorer
Editor - Untitled1 *
data x;
do x = 1 to 5;
y=x;
output;
y=x+1;
output;
end;
run;
proc sort data=x;
by x y;
run;
data first;
set x;
by x y;
if first.x;
run;
Log - (Untitled)
52
53 data first;
54 set x;
55 by x y;
56 if first.x;
57 run;
NOTE: There were 10 observations read from the data set WORK
NOTE: The data set WORK.FIRST has 5 observations and 2 vari
NOTE: DATA statement used (Total process time):
real time 0.00 seconds
cpu time 0.01 seconds
VIEWTABLE: Work.X
x y
1 1 1
2 1 2
3 2 2
4 2 3
5 3 3
6 3 4
7 4 4
8 4 5
9 5 5
10 5 6
VIEWTABLE: Work.First
x y
1 1 1
2 2 2
3 3 3
4 4 4
5 5 5
Log - (Untitled)
Editor - Untitled1 *
VIEWTABLE: Work.X
VIEWTABLE: Work.First
NOTE: You cannot shrink the window beyond this point.
C:\Users\jinzha

SAS CONCEPTS

Bonus #2 Custom formats

In [65]:

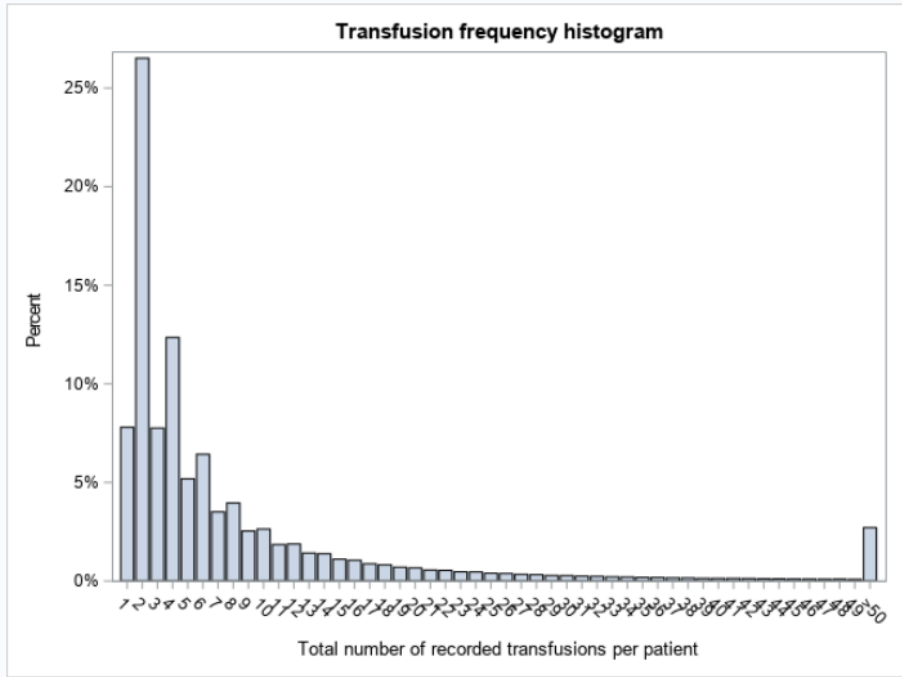
```
proc sql;
create table p_tx as
select distinct
     a.idnr,
     count(a.idnr) as transfusions
from transfusion a inner join clean.persons b on a.idnr=b.idnr where b.error=0
group by a.idnr;

create table p_tx_freq as
select distinct
    transfusions,
    count(transfusions) as count
from p_tx
group by transfusions;
quit;

proc format;
value fiftyplus
 50-high = ">50"
;

title "Transfusion frequency histogram";
proc sgplot data=p_tx_freq;
format transfusions fiftyplus.;
vbar transfusions / response=count stat=percent;
yaxis label="Percent";
xaxis label="Total number of recorded transfusions per patient";
run;
```

Out[65]:



SAS CONCEPTS RECAP

#1 Choose your favorite IDE
#2 Row-by-row logic (magnet bands)
#3 Work folder – default and temporary folder
#4 Create datasets with the “data” step
#5 Create macro variables with “%let”
#6 Char + Num variables, but many formats!
#7 If-then-else
#8 Loops – do, until, while
#9 Native support for SQL in Proc SQL
#10 Use SAS Macros to save time

Bonus #1 Use “by processing” and first.variables
Bonus #2 Use custom formats

Demo