

innovation

**Clinical data to information, quick,
standardised and validated with
knowledge of proc FCMP**

PhUSE

October 2015

October 20, 2015

We Like this



We Love this



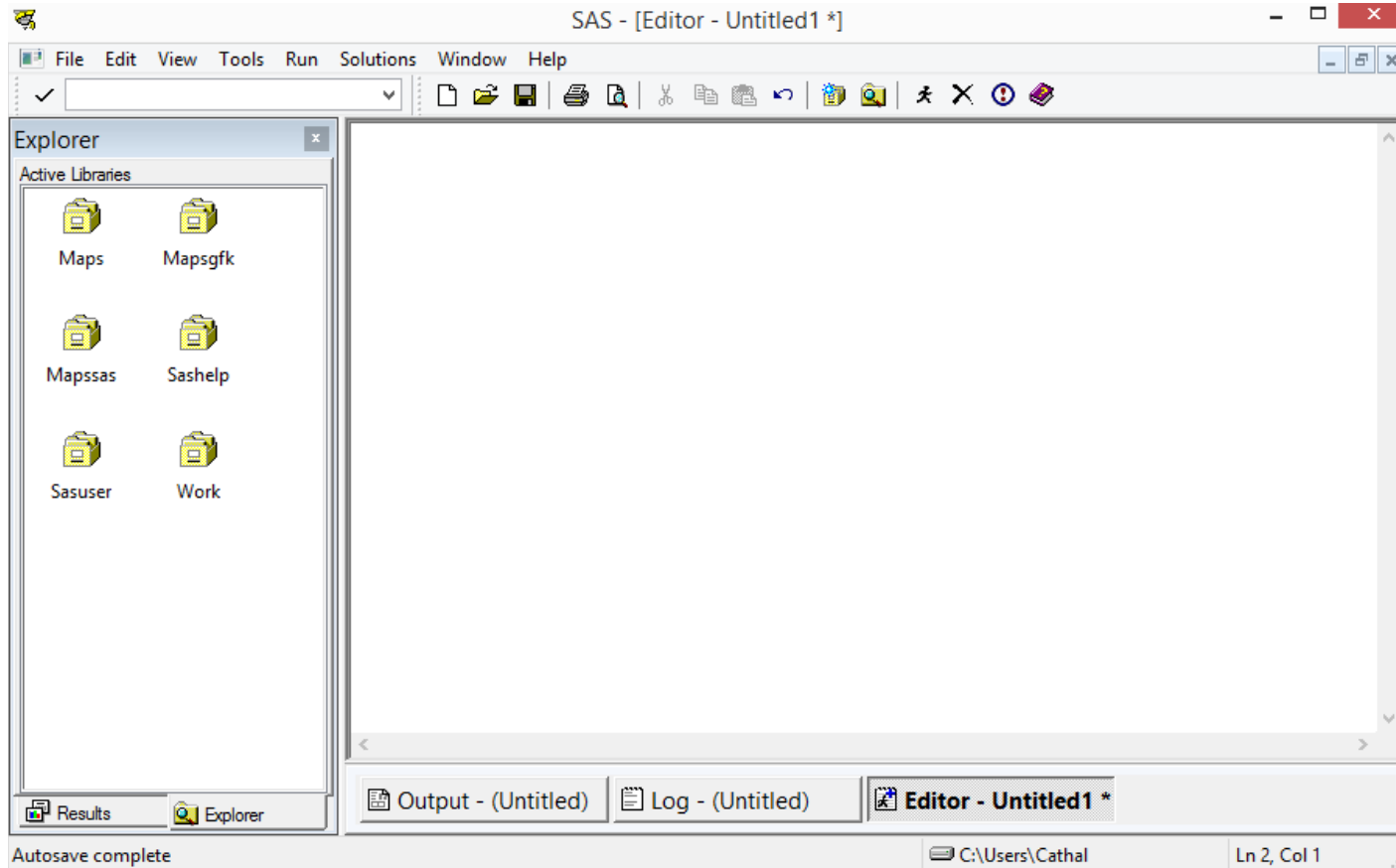
Leads to this



Eat Sleep Code Repeat

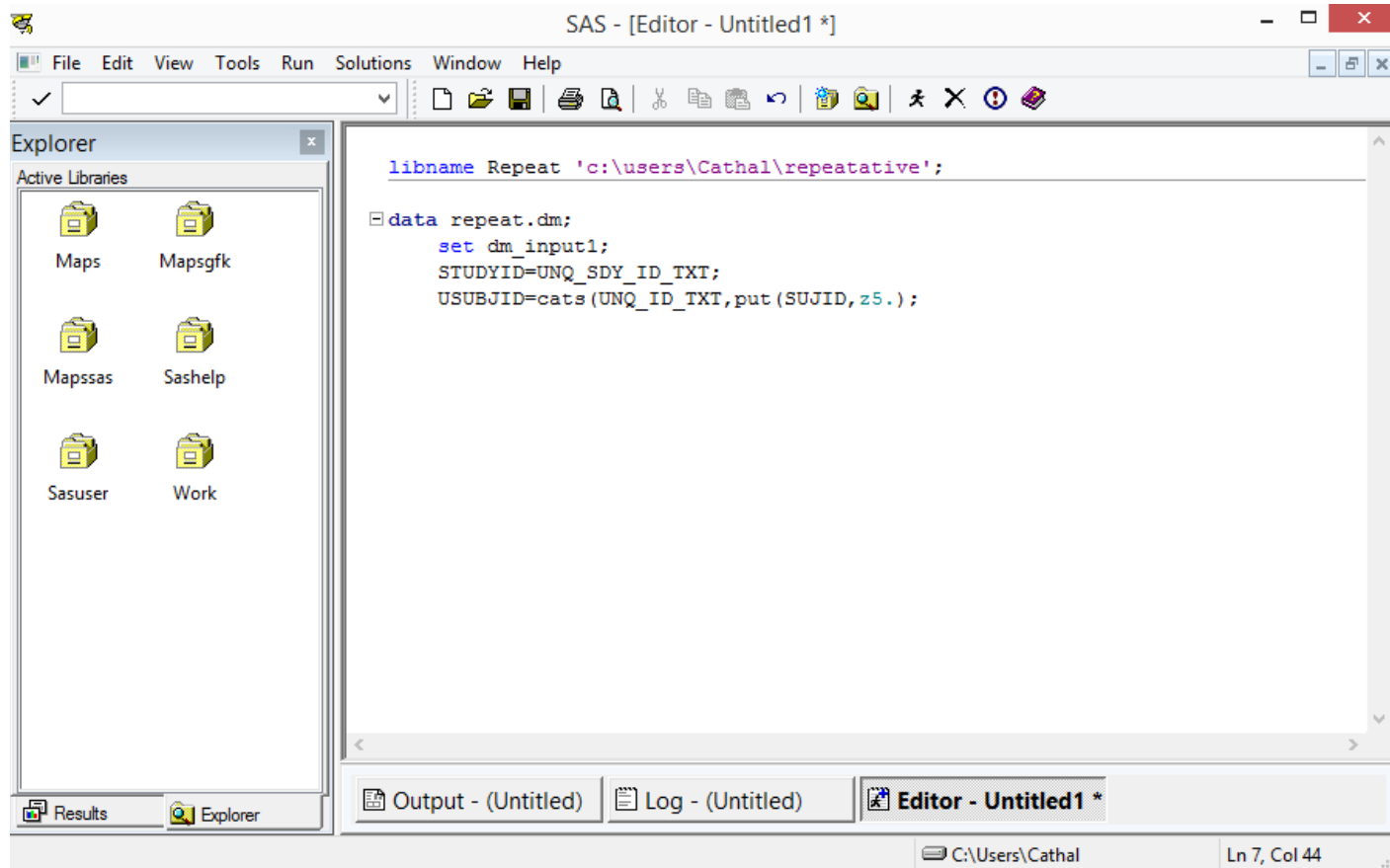
```
data EatSleepCodeRepeat;  
  length LIFE $30.;  
  do While(CoderStatus ne "DEAD");  
    LIFE= "Eat";  
    LIFE=cat(strip(LIFE), " Sleep");  
    LIFE=cat(strip(LIFE), " Code");  
    LIFE=cat(strip(LIFE), " Repeat");  
    CoderStatus="ALIVE";  
    output;  
  end;  
run;
```

How do we program



■ Start from Scratch

How do we program



■ Type out code line by line

How do we program

```
CheatSheet - Notepad
File Edit Format View Help

USUBJID

catx('-',STUDYID,put(input(c.SITEMNEMONIC,best3.),z3.), put(a.SUBJID,z5.))

RFSTDTC

case
when EXSTDATYY ne '' then
    cat(strip(EXSTDATYY),
        ifc(EXSTDATMO not in ("","-99"),'-')||put(input(left(EXSTDATMO),best2.),z2.),' '),
        ifc(EXSTDATDD not in ("","-99"),'-')||put(input(left(EXSTDATDD),best2.),z2.),' '),
        ifc(EXSTTIMHR not in ("","-99"),'T')||put(input(left(EXSTTIMHR),best2.),z2.),' '),
        ifc(EXSTTIMMI not in ("","-99"),':')||put(input(left(EXSTTIMMI),best2.),z2.),' ') )
else ''
end

as RFSTDTC length = 20
label = 'Subject Reference Start Date/Time'

XXSTDY

case
when RFSTDTC in("","","") or AESTDTC in("","","") then .
when input(substr(AESTDTC,1,10),is8601da.)< input(substr(RFSTDTC,1,10),is8601da.)
    then input(substr(AESTDTC,1,10),is8601da.)- input(substr(RFSTDTC,1,10),is8601da.)
when input(substr(AESTDTC,1,10),is8601da.)>= input(substr(RFSTDTC,1,10),is8601da.)
    then input(substr(AESTDTC,1,10),is8601da.)- input(substr(RFSTDTC,1,10),is8601da.)+1
else .
end
```

■ Cheatsheet copy/paste

How do we program?

```
❏ Data AE;
  set work.AE_CRF;

  if AESTDATYY ne "" then
    AESTDTC=cat(strip(AESTDATYY),
    ifc(AESTDATMO not in ("", "-99"), '-' || put(input(left(AESTDATMO), best2.), z2.), ' '),
    ifc(AESTDATDD not in ("", "-99"), '-' || put(input(left(AESTDATDD), best2.), z2.), ' '),
    ifc(AESTTIMHR not in ("", "-99"), 'T' || put(input(left(AESTTIMHR), best2.), z2.), ' '),
    ifc(AESTTIMMI not in ("", "-99"), ':' || put(input(left(AESTTIMMI), best2.), z2.), ' ') ) ;
  else AESTDTC=' ' ;

  if AEENDATYY ne "" then
    AEENDTC=cat(strip(DATYY),
    ifc(AEENDATMO not in ("", "-99"), '-' || put(input(left(AEENDATMO), best2.), z2.), ' '),
    ifc(AEENDATDD not in ("", "-99"), '-' || put(input(left(AEENDATDD), best2.), z2.), ' '),
    ifc(AEENTIMHR not in ("", "-99"), 'T' || put(input(left(AEENTIMHR), best2.), z2.), ' '),
    ifc(AEENTIMMI not in ("", "-99"), ':' || put(input(left(AEENTIMMI), best2.), z2.), ' ') ) ;
  else AEENDTC=' ' ;

run;
```

Not validated

```
▣ Data AE;
  set work.AE_CRF;

  if AESTDATYY ne "" then
    AESTDTC=cat(strip(AESTDATYY),
    ifc(AESTDATMO not in ("","-99"),'-'|put(input(left(AESTDATMO),best2.),z2.),' '),
    ifc(AESTDATDD not in ("","-99"),'-'|put(input(left(AESTDATDD),best2.),z2.),' '),
    ifc(AESTTIMHR not in ("","-99"),'T'|put(input(left(AESTTIMHR),best2.),z2.),' '),
    ifc(AESTTIMMI not in ("","-99"),':'|put(input(left(AESTTIMMI),best2.),z2.),' ') );
  else AESTDTC='';

  if AEENDATYY ne "" then
    AEENDTC=cat(strip(DATYY),
    ifc(AEENDATMO not in ("","-99"),'-'|put(input(left(AEENDATMO),best2.),z2.),' '),
    ifc(AEENDATDD not in ("","-99"),'-'|put(input(left(AEENDATDD),best2.),z2.),' '),
    ifc(AEENTIMHR not in ("","-99"),'T'|put(input(left(AEENTIMHR),best2.),z2.),' '),
    ifc(AEENTIMMI not in ("","-99"),':'|put(input(left(AEENTIMMI),best2.),z2.),' ') );
  else AEENDTC='';

run;
```

What could we do?

❑ Data AE;

```
set work.AE_CRF;
```

```
AESTDTC=sdmxxdtc (AESTDATYY, AESTDATMO, AESTDATDD, AESTTIMHR, AESTTIMMI) ;
```

```
AEENDTC=sdmxxdtc (AEENDATYY, AEENDATMO, AEENDATDD, AEENTIMHR, AEENTIMMI) ;
```

```
run;
```

How is a function Created?

```
proc fcmp outlib=work.funcs.clinical; *This tell us where the functions will be saved;

*function name with inputs and their datatypes. Dollar at end indicates this returns a Char value;
function sdtmxxdtc(DATYY$, DATMO$, DATDD$, TIMHR$, TIMMI$)$;
  if DATYY ne "" then
    date=cat(strip(DATYY),
      ifc(DATMO not in ("", "-99"), '-' || put(input(left(DATMO), best2.), z2.), ' '),
      ifc(DATDD not in ("", "-99"), '-' || put(input(left(DATDD), best2.), z2.), ' '),
      ifc(TIMHR not in ("", "-99"), 'T' || put(input(left(TIMHR), best2.), z2.), ' '),
      ifc(TIMMI not in ("", "-99"), ':' || put(input(left(TIMMI), best2.), z2.), ' ') );
  else date='';
return(date); *the value to be returned;
endsub;
```

How is a function Created?

```
= proc fcmp outlib=work.funcs.clinical; *This tell us where the functions will be saved;

*function name with inputs and their datatypes. Dollar at end indicates this returns a Char value;
function sdtmxxdtc(DATYY$, DATMO$, DATDD$, TIMHR$, TIMMI$)$;
  if DATYY ne "" then
    date=cat(strip(DATYY),
      ifc(DATMO not in ("","-99"),'-')||put(input(left(DATMO),best2.),z2.),' '),
      ifc(DATDD not in ("","-99"),'-')||put(input(left(DATDD),best2.),z2.),' '),
      ifc(TIMHR not in ("","-99"),'T')||put(input(left(TIMHR),best2.),z2.),' '),
      ifc(TIMMI not in ("","-99"),':')||put(input(left(TIMMI),best2.),z2.),' ') );
  else date='';
return(date);*the value to be returned;
endsub;
```

How is a function Created?

```
proc fcmp outlib=work.funcs.clinical; *This tell us where the functions will be saved;

*function name with inputs and their datatypes. Dollar at end indicates this returns a Char value;
function sdtmxxdtc(DATYY$, DATMO$, DATDD$, TIMHR$, TIMMI$)$;
  if DATYY ne "" then
    date=cat(strip(DATYY),
      ifc(DATMO not in ("","-99"), '-' || put(input(left(DATMO), best2.), z2.), ' '),
      ifc(DATDD not in ("","-99"), '-' || put(input(left(DATDD), best2.), z2.), ' '),
      ifc(TIMHR not in ("","-99"), 'T' || put(input(left(TIMHR), best2.), z2.), ' '),
      ifc(TIMMI not in ("","-99"), ':' || put(input(left(TIMMI), best2.), z2.), ' ') );
  else date='';
  return(date); *the value to be returned;
endsub;
```

How is a function Created?

```
proc fcmp outlib=work.funcs.clinical;*This tell us where the functions will be saved;
```

```
*function name with inputs and their datatypes. Dollar at end indicates this returns a Char value;
```

```
function sdtmxxdtc(DATYY$,DATMO$,DATDD$,TIMHR$,TIMMI$)$;
```

```
  if DATYY ne "" then
    date=cat(strip(DATYY),
    ifc(DATMO not in ("","-99"),'-'||put(input(left(DATMO),best2.),z2.),' '),
    ifc(DATDD not in ("","-99"),'-'||put(input(left(DATDD),best2.),z2.),' '),
    ifc(TIMHR not in ("","-99"),'T'||put(input(left(TIMHR),best2.),z2.),' '),
    ifc(TIMMI not in ("","-99"),':'||put(input(left(TIMMI),best2.),z2.),' ') );
  else date='';
```

```
  return(date);*the value to be returned;
```

```
endsub;
```

Using a function

	Subjid	RFSTDTC	AESTDATYY	AESTDATMO	AESTDATDD	AESTTIMHR	AESTTIMMI
1	1000	2015-07-14T18:16	2015	08	10	17	32
2	1001	2014-07-10	2014	8	1	07	02
3	1002	2013-07-14	2013	10	11	8	32
4	1003	2015-07-14	2015	1	9	16	2
5	1004	2014-07-14	2014	6	17		
6	1005	2013-07-14	2013	8	14		

```
options cmplib=work.funcs; *tell sas to get user written functions from here;
```

```
data sdtmoutput1;  
  set sdtminput1;  
  length AESTDTC $20.;
```

```
AESTDTC=sdtmxxdtc(AESTDATYY,AESTDATMO,AESTDATDD,AESTTIMHR,AESTTIMMI);  
run;
```

Using a function

VIEWTABLE: Work.Sdtmoutput1								
	Subjid	RFSTDTC	AESTDATYY	AESTDATMO	AESTDATDD	AESTTIMHR	AESTTIMMI	AESTDTC
1	1000	2015-07-14T18:16	2015	08	10	17	32	2015-08-10T17:32
2	1001	2014-07-10	2014	8	1	07	02	2014-08-01T07:02
3	1002	2013-07-14	2013	10	11	8	32	2013-10-11T08:32
4	1003	2015-07-14	2015	1	9	16	2	2015-01-09T16:02
5	1004	2014-07-14	2014	6	17			2014-06-17
6	1005	2013-07-14	2013	8	14			2013-08-14

Numeric Function

```
*second function declared, no dollar sign at the end indicates that this returns a numeric value;
function sdtmxxdy(rfstdtc$,dtc$);
    if (rfstdtc in('.') or dtc in('.') then
        stdy=.;
    else if input(substr(dtc,1,10),is8601da.)< input(substr(rfstdtc,1,10),is8601da.) then
        stdy=input(substr(dtc,1,10),is8601da.)- input(substr(rfstdtc,1,10),is8601da.);
    else if input(substr(dtc,1,10),is8601da.)>= input(substr(rfstdtc,1,10),is8601da.) then
        stdy=input(substr(dtc,1,10),is8601da.)- input(substr(rfstdtc,1,10),is8601da.)+1;
    else
        stdy=.;
    return(stdy);
endsub;
```

Numeric Function

```
options cmplib=work.funcs; *tell sas to get unknown functions from here;
```

```
data sdtmoutput2;  
  set sdtminput1;  
  length AESTDTC $20.;
```

```
AESTDTC=sdtmxxdtc (AESTDATYY,AESTDATMO,AESTDATDD,AESTTIMHR,AESTTIMMI) ;  
AESTDY=sdtmxxdy (RFSTDTC,AESTDTC) ;  
run;
```

VIEWTABLE: Work.Sdtmoutput2									
	Subjid	RFSTDTC	AESTDATYY	AESTDATMO	AESTDATDD	AESTTIMHR	AESTTIMMI	AESTDTC	AESTDY
1	1000	2015-07-14T18:16	2015	08	10	17	32	2015-08-10T17:32	28
2	1001	2014-07-10	2014	8	1	07	02	2014-08-01T07:02	23
3	1002	2013-07-14	2013	10	11	8	32	2013-10-11T08:32	90
4	1003	2015-07-14	2015	1	9	16	2	2015-01-09T16:02	-186
5	1004	2014-07-14	2014	6	17			2014-06-17	-27
6	1005	2013-07-14	2013	8	14			2013-08-14	32

Why Use them?

- When validated, less code to check for errors
- Faster programming
- Quicker Validation
- Industry standard programs make sharing easier

Functions Vs Macros

- Easier to interpret
- Faster performance
- Certain places Macro code cannot be used(CDI transformations)

The Future

- Industry Standard functions.
- Central repository with versioned functions.
- Releases with CDISC updates.

Contact Me

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