Making Friends: Clean Code

A brief guide on loving yourself and others through better programming

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Outline

- Writing readable programs

- Improving comments

- Making friends

Writing Readable Programs

Key Concept

- Minimize the time it would take someone else to understand

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  - Write tidy, consistent code

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- Minimize the time it would take someone else to understand
  - Write tidy, consistent code
  - Choose specific names that describe the value or purpose of the variable/dataset

Case Study

```
data dat;do i = 1 to 4;do j = 1 to 5;output;end;end;run;
```

	i	j
1	1	1
2	1	2
3	1	3
4	1	4
5	1	5
6	2	1
7	2	2
8	2	3
9	2	4
10	2	5
11	3	1
12	3	2
13	3	3
14	3	4
15	3	5
16	4	1
17	4	2
18	4	3
19	4	4
20	4	5

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  do i = 1 to 4;
  do j = 1 to 5;
  output;
  end;
  end;
  run;
```

1. Make a statement

Case Study

```
data dat;do i = 1 to 4;do j = 1 to 5;output;end;end;run;
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1. Make a statement

```
data dat;
  do i = 1 to 4;
  do j = 1 to 5;
  output;
  end;
  end;
  run;
```

2. Tab

```
data dat;
    do i = 1 to 4;
    do j = 1 to 5;
    output;
    end;
    end;
  run;
```

Case Study

```
data dat;do i = 1 to 4;do j = 1 to 5;output;end;end;run;
```

1. Make a statement

```
data dat;
  do i = 1 to 4;
  do j = 1 to 5;
  output;
  end;
  end;
  run;
```

2. Tab

```
data dat;
      do i = 1 to 4;
      do j = 1 to 5;
      output;
      end;
      end;
  run;
```

3. Tab tab tab

```
data dat;
      do i = 1 to 4;
          do j = 1 to 5;
              output;
          end;
      end;
  run;
```

Case Study

```
data dat;do i = 1 to 4;do j = 1 to 5;output;end;end;run;
```

4. Descriptive variable names

```
data study_design;
    do trial = 1 to 4;
        do treatment = 1 to 5;
            output;
        end;
    end;
run;
```

Case Study

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data dat;do i = 1 to 4;do j = 1 to 5;output;end;end;run;
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4. Descriptive variable names

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        do treatment = 1 to 5;
            output;
        end;
    end;
run;
```

BE CONSISTENT

General Guidelines

- Programs should look neat

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  - Use white space

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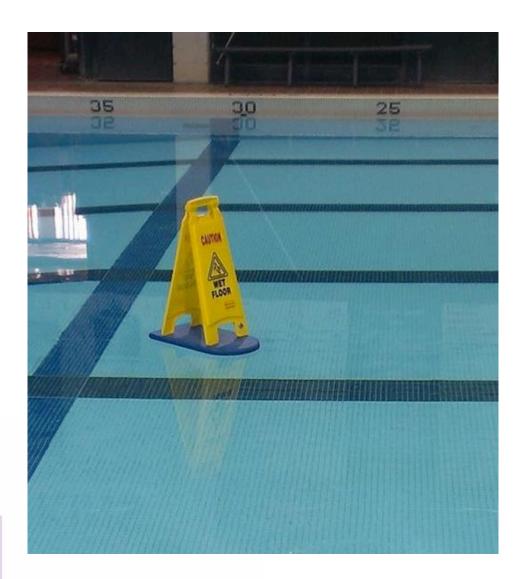 - Consistency

/* Program Comments */

Key Concept

- Write comments that help the reader understand the code more easily
  - **<u>Why</u>**
  - What
  - How

Comments

Useless comments

```sas
data final_cohort;
    set raw_data;

    * remove participants under age 40;
    if age < 40 then delete;

    * categorize age;
    if 40 <= age <= 47 then age_cat=1;
        else if 47 < age  <= 55 then age_cat=2;
        else if  55 < age then age_cat=3;

    * remove average weekly calories from final dataset;
    drop avg_weekly_calories;
run;
```

Comments that make friends

```
data final_cohort;
    set raw_data;

    /* participants under the age of 40 were ineligible to participate in the study */
    if age < 40 then delete;

    /* age category may look weird, but cluster anlaysis was used to determine groups */
    if 40 <= age <= 47 then age_cat=1;
        else if 47 < age  <= 55 then age_cat=2;
        else if  55 < age  then age_cat=3;

    /* Dr. Doctor does not think average weekly caloric intake is necessary to adjust for
        as there is limited evidence it is associated with the outcome */
    drop avg_weekly_calories;
run;
```

Headers

```
************************************************************************************;
**** Program Name: VanSUG_Presentation                                         ****;
**** Objective...: Give insightful talk                                        ****;
****                                                                           ****;
**** Directory...: C:\headers                                                  ****;
****                                                                           ****;
**** Author......: BB                                                          ****;
**** Date........: May 9, 2018                                                 ****;
**** SAS Version.: 9.4 (TS1M3)                                                 ****;
****                                                                           ****;
**** Input Files.: None                                                        ****;
**** Output Files: great_presentation.pptx                                     ****;
****                                                                           ****;
**** Notes.......:                                                             ****;
****                                                                           ****;
**** Date Modified  By      Reason                                             ****;
**** -------------  ----     -------------------------                         ****;
************************************************************************************;
```

Tying it all together

```
%macro pro_programmer_macro(var1, var2, var3, var4);
 %if %lowcase(&var4.)=incid %then %do;
proc datasets lib=work nolist;
delete parms_&var2._&var4;
quit; run;
%if &var3=1 %then %do;%do i=1 %to 2;
data parms_0&i.;
set modelfit1_0&i.;
if incid_simple_grp="&var1.";
model=&i.;
run;
proc append base=parms_&var2._&var4 data=parms_0&i. force;
run;
%end;%end;


    .
    .
    .
    .

%end;
%mend;
```

```sas
/****************************************************************************/
/* OBJECTIVE...: Get model fit parameters for all projection models for a given site   */
/* INSTRUCTIONS: This macro is used after running the incidence or mortality projections   */
/*               program (in C:\projections). The 'site' variable (aka incid_simple_grp)    */
/*               must have the correct capitalization. Specify incid or mort for incidmort   */
/*               depending on whether incidence or mortality projections were run.    */
/* NOTES.......: Refer to the documentation    */
/*               (C:\Users\Enlightened_programmer\projections_documentation.docx) for the   */
/*               section of a given site and further information on the programs    */
/****************************************************************************/
%macro get_model_parms_please(site, name, section, incidmort);

    %if %lowcase(&incidmort.)=incid %then %do;

        /* datasets are iteratively appended, so the base dataset needs to be cleared
            in case it already exists */
        proc datasets lib=work nolist;
            delete parms_&name._&incidmort;
        quit; run;

        %if &section=1 %then %do;
            %do i=1 %to 2;
                data parms_0&i.;
                    set modelfit1_0&i.;

                    if incid_simple_grp="&site.";

                    model=&i.;
                run;

                proc append base=parms_&name._&incidmort data=parms_0&i. force;
                run;
            %end;
        %end;

        .
        .
        .
        .

    %end;
%mend;
```

```sas
%macro pro_programmer_macro(var1, var2, var3, var4);
 %if %lowcase(&var4.)=incid %then %do;
 proc datasets lib=work nolist;
 delete parms_&var2._&var4;
 quit; run;
 %if &var3=1 %then %do;%do i=1 %to 2;
 data parms_0&i.;
 set modelfit1_0&i.;
 if incid_simple_grp="&var1.";
 model=&i.;
 run;
 proc append base=parms_&var2._&var4 data=parms_0&i. force;
 run;
 %end;%end;


     .
     .
     .
     .
 %end;
 %mend;
```

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             delete parms_&name._&incidmort;
         quit; run;

         %if &section=1 %then %do;
             %do i=1 %to 2;
                 data parms_0&i.;
                     set modelfit1_0&i.;

                     if incid_simple_grp="&site.";

                     model=&i.;
                 run;

                 proc append base=parms_&name._&incidmort data=parms_0&i. force;
                 run;
             %end;
         %end;


         .
         .
         .
         .
     %end;
 %mend;
```

Summary

- Make friends by being consistent, using white space, and using indents

- Make friends with insightful comments

/* Thank you */

Boswell D, Foucher T. The Art of Readable Code. "O'Reilly Media, Inc."; 2011.

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