SAS Global Certification:
BASE Programming Certification Review
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Preparing for the SAS® Base Programming Certification Exam

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SAS Global Certification Webinars


February 8, 2017

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Today: September 14, 2017

SAS® Certification Review: Base Programmer for SAS®9
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## Chapter 1: Preparing for the SAS® Base Programming Certification Exam

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# Chapter 1: Preparing for the SAS® Base Programming Certification Exam

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SAS Certification Credentials

SAS offers certification credentials that validate candidate’s knowledge within several certification areas.

- Foundation Tools
- Advanced Analytics
- BI & Analytics
- Data Management
- Administration
SAS Certification Credentials

In this webinar, the focus is the SAS Certified Base Programmer for SAS®9 credential from Foundation Tools.

The SAS Certified Base Programmer for SAS®9 credential is the ideal certification for those relatively new to SAS programming or new to SAS certification.

When you hold the SAS Certified Base Programmer for SAS®9 credential, you can take the following exams:

• Advanced Programming for SAS®9 exam
• Clinical Trials Programming Using SAS®9 – Accelerated Version
The SAS Base Programming exam contains multiple-choice questions.

Given the following SAS error log

```
44   data WORK.OUTPUT;
45       set SASHELP.CLASS;
46       BMI=(Weight*703)/Height**2;
47       where bmi ge 20;
       ERROR: Variable bmi is not on file SASHELP.CLASS.
48       run;
```

What change to the program will correct the error?

A. Replace the WHERE statement with an IF statement
B. Change the ** in the BMI formula to a single *
C. Change bmi to BMI in the WHERE statement
D. Add a (Keep=BMI) option to the SET statement
Base Programming Exam Questions

All multiple-choice questions contain a question and four possible answers with only one correct answer. Support information might appear prior to the question.

Given the following SAS error log

```
44   data WORK.OUTPUT;
45   set SASHELP.CLASS;
46   BMI=(Weight*703)/Height**2;
47   where bmi ge 20;
ERROR: Variable bmi is not on file SASHELP.CLASS.
48   run;
```

What change to the program will correct the error?

A. Replace the WHERE statement with an IF statement
B. Change the ** in the BMI formula to a single *
C. Change bmi to BMI in the WHERE statement
D. Add a (Keep=BMI) option to the SET statement

support information

question

four possible answers
Base Programming Exam Questions

In addition to multiple-choice questions, the SAS Base Programming exam contains short-answer questions.

Given the SAS data set WORK.INPUT:

<table>
<thead>
<tr>
<th>Var1</th>
<th>Var2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>one</td>
</tr>
<tr>
<td>A</td>
<td>two</td>
</tr>
<tr>
<td>B</td>
<td>three</td>
</tr>
<tr>
<td>C</td>
<td>four</td>
</tr>
<tr>
<td>A</td>
<td>five</td>
</tr>
</tbody>
</table>

The following SAS program is submitted:

```sas
data WORK.ONE WORK.TWO;
  set WORK.INPUT;
  if Var1='A' then output WORK.ONE;
  output;
run;
```

How many observations will be in data set WORK.ONE?

Enter your numeric answer. Do not add leading or trailing spaces to your answer.
Base Programming Exam Questions

Specific instructions are given for short-answer questions such as enter as a numeric with no extra spaces.

Given the SAS data set WORK.INPUT:

<table>
<thead>
<tr>
<th>Var1</th>
<th>Var2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>one</td>
</tr>
<tr>
<td>A</td>
<td>two</td>
</tr>
<tr>
<td>B</td>
<td>three</td>
</tr>
<tr>
<td>C</td>
<td>four</td>
</tr>
<tr>
<td>A</td>
<td>five</td>
</tr>
</tbody>
</table>

The following SAS program is submitted:

data WORK.ONE WORK.TWO;
  set WORK.INPUT;
  if Var1='A' then output WORK.ONE;
  output;
run;

How many observations will be in data set WORK.ONE? 8

Enter your numeric answer. Do not add leading or trailing spaces to your answer.
Base Programming Exam Specifics

The following are specifics of the SAS Base Programming for SAS® 9 exam:

- **60-65** multiple-choice and short-answer questions
- **110** minutes to complete exam
- Closed book
- Exam taken on a computer
- Score received after completing the exam
- Must achieve a score of **70**% correct to pass
Pearson VUE is the exam delivery partner for administering the SAS Base Programming exam.
Pearson VUE delivers SAS certification exams through a comprehensive and secure network of test centers in 175 countries.

Candidates must create a web account with Pearson VUE before scheduling a SAS exam.

Applicants will be photographed and asked to provide a digital signature at Pearson VUE in addition to the identification and admission requirements.

Within North America, the fees associated with an exam offered through Pearson VUE is $180 USD.

For more information about Pearson VUE and to register for a SAS exam, visit Pearson VUE’s website.
Base Programming Exam Content Areas

The intended candidate for the SAS Base Programming exam is someone with current SAS programming experience in the following five content areas:

1. Accessing Data
2. Creating Data Structures
3. Managing Data
4. Generating Reports
5. Handling Errors

In addition, candidates should be familiar with the enhancements and new functionality available in SAS 9.4.
Base Programming Exam Content Guide

Exam Content Guide

SAS Base Programming for SAS 9 Exam

Accessing Data

Use FORMATTED and LIST input to read raw data files.

- Distinguish between character and numeric data, between standard and nonstandard numeric data.
- Use the INPUT statement with formatted input to read character, standard and nonstandard fixed-field data: INPUT variable informat;
- Use the INPUT statement with list input to read character, standard and nonstandard free-format data: INPUT variable $;

Use INFILE statement options to accessing when reading raw data files.
SAS Certification Website

SAS Certification Website

⚠️ All information in this webinar is subject to change. Check out the certification website before taking the SAS Base Programming exam.
## Chapter 1: Preparing for the SAS® Base Programming Certification Exam

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Base Programming Exam Preparation
Multiple resources are available for your preparation.

Useful Resources

- Refresh your Programming 1 and 2 knowledge with SAS Programming Flash Cards.
  - SAS® Programming Flash Cards Deck

- Get everything you need to learn SAS - free. Download, install, learn and get certified.
  - SAS® University Edition
Training – Programming Courses

The content in the SAS Programming 1 and SAS Programming 2 courses is an indicator of the content on the SAS Base Programming exam.
Training – Certification Review Course

http://support.sas.com/training/

SAS Certification Review: Base Programming for SAS 9

This course provides a review of the majority of topics in the SAS Base Programming Exam for SAS 9. It addresses the five exam content areas: Accessing Data, Creating Data Structures, Managing Data, Generating Reports, and Handling Errors.

This course can help prepare you for the following certification exam(s): SAS Base Programming for SAS 9.

Learn how to

- read, create, and combine SAS data sets
- read and create raw data files
- create variables using the assignment statement and using conditional processing
- manipulate data using SAS functions
- process data with DO loops and with arrays
- create different types of reports using the PRINT procedure, the REPORT procedure, the FREQ procedure, or the MEANS procedure
- create formats with the FORMAT procedure
- create HTML reports with ODS.

Who should attend

SAS users who are interested in a review course before taking the SAS Base Programming Exam for SAS 9, part of the SAS Global Certification Program.

Formats available

- **Classroom:** 2.0 days
- **Live Web Classroom:** 4 half-day sessions

System Requirements

[View demo]
Books – Certification Prep Guide

https://www.sas.com/sas/books.html

The official prep guide covers all of the objectives tested in the exam.


In Stock

Publisher: SAS Institute
Copyright Date: July 2011

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Books – SAS Product Documentation

http://support.sas.com/documentation/onlinedoc/base/

Free SAS Product Documentation is available.
Practice Exams


Practice exams for select exams are now available through SAS and Pearson VUE for purchase.
SAS Programming Flash Cards


SAS® Curriculum Pathways® supplies access to flash cards that review SAS programming concepts.

You can access the flash cards through a web version or by downloading the SAS Flash Cards iOS app.
Chapter 1: Preparing for the SAS® Base Programming Certification Exam

1.1 Exam Specifics

1.2 Exam Preparation

1.3 Handling Errors
Handling Errors

The content area of **Handling Errors** includes the following topics:

- Identify and resolve programming logic errors.
- Recognize and correct syntax errors.
- Examine and resolve data errors.
Exam Content Guide

Handling Errors

**Identify and resolve programming logic errors.**
- Use the PUTLOG Statement in the Data Step to help identify logic errors.
- Use PUTLOG to write the value of a variable, formatted values, or to write values of all variables.
- Use PUTLOG with Conditional logic.
- Use temporary variables N and ERROR to debug a DATA step.

**Recognize and correct syntax errors.**
- Identify the characteristics of SAS statements.
- Define SAS syntax rules including the typical types of syntax errors such as misspelled keywords, unmatched quotation marks, missing semicolons, and invalid options.
- Use the log to help diagnose syntax errors in a given program.

**Examine and resolve data errors.**
- Use the SAS system option, ERRORS=n, to specify the maximum number of observations for which SAS issues complete error messages written to the log.
- Given a SAS program, use the log to determine the reason for a data error.
Understanding Logic Errors

Logic errors occur when SAS statements follow the rules of the SAS language but the results are not correct. No errors are written to the SAS log.

The PUTLOG statement can be used for debugging logic errors.

```
PUTLOG '<text>'
   <variable-name=>
   <variable-name format>
   <_ALL_>;
```

The PUTLOG statement writes a message that you specify to the SAS log.
1. Which SAS log is correct based on the code?

a.```sas
971  data _null_
972    set cityst;
973    by State City;
974    putlog First.State First.City;
975  run;
```

b.```sas
971  data _null_
972    set cityst;
973    by State City;
974    putlog First.State First.City;
975  run;
```

FIRST.State=1 FIRST.City=1
FIRST.State=0 FIRST.City=0
FIRST.State=0 FIRST.City=1
FIRST.State=1 FIRST.City=1
1. Which SAS log is correct based on the code?

a.
```
971  data _null_;  
972      set cityst; 
973      by State City; 
974      putlog First.State First.City; 
975  run;
```

b.
```
971  data _null_;  
972      set cityst; 
973      by State City; 
974      putlog First.State First.City; 
975  run;
```

FIRST.State=1  FIRST.City=1
FIRST.State=0  FIRST.City=0
FIRST.State=0  FIRST.City=1
FIRST.State=1  FIRST.City=1
Understanding Syntax Errors

Syntax errors are errors made in the SAS statements of a program. SAS detects syntax errors as it compiles each DATA or PROC step.

The following are some examples of syntax errors:

• misspelled keywords
• missing or invalid punctuation
• invalid statement or data set options

```
21   var Region, Product, Stores, Sales;
    
ERROR 22-322: Syntax error, expecting one of the following: a name, ;, -, /, :, _ALL_, _CHARACTER_, _CHAR_, _NUMERIC_.
```
2. Given the following SAS log:

```
925  proc print data=sashelp.shoes noobs
926     var Region Product Stores Sales;
---
22
76
ERROR 22-322: Syntax error, expecting one of the following: ;,
BLANKLINE, DATA, DOUBLE, HEADING, LABEL, N, NOOBS, OBS, ROUND, ROWS, SPLIT, STYLE,
SUMLABEL,
UNIFORM, WIDTH.
ERROR 76-322: Syntax error, statement will be ignored.
927  run;
```

a. misspelled keyword
b. invalid statement
c. missing commas
d. missing semicolon
2. Given the following SAS log:

```
925  proc print data=sashelp.shoes noobs
926      var Region Product Stores Sales;
         --
         22
         76
ERROR 22-322: Syntax error, expecting one of the following: ;,,
            BLANKLINE, DATA, DOUBLE, HEADING, LABEL, N,
            NOOBS, OBS, ROUND, ROWS, SPLIT, STYLE,
            SUMLABEL,
            UNIFORM, WIDTH.
ERROR 76-322: Syntax error, statement will be ignored.
927  run;
```

a. misspelled keyword
b. invalid statement
c. missing commas
d. missing semicolon
Understanding Data Errors

Data errors occur when the raw data that you are analyzing with a SAS program contains invalid values.

Data errors do not cause a program to stop but instead generate notes in the SAS log.

```
30   data rawdata;
31      infile 'raw.dat';
32      input char $ num date date9.;
33   run;

NOTE: Invalid data for num in line 1 5-6.
RULE:  1         ABC XY 15JUN2013 16
       char=ABC num=. date=19524 _ERROR_=1 _N_=1
```
3. Given the following SAS log:

```sas
data new;
  input Name $4. +1 Hired mmddyy10.;
datalines;
NOTE: Invalid data for Hired in line 950 6-15.
RULE: ----+----+----+----+----+----+----+----+----+----+----+----+
950    Jill 10/51/2012
Name=Jill Hired=. _ERROR_=1 _N_=3
```

What is the reason for the NOTE?

a. incorrect starting position
b. invalid date
c. wrong informat
d. wrong variable type
3. Given the following SAS log:

```sas
data new;
input Name $4. +1 Hired mmddyy10.;
datalines;
NOTE: Invalid data for Hired in line 950 6-15.
RULE: ---+---1---+---2---+---3---+---4---+---5---
950   Jill 10/51/2012
Name=Jill Hired=. _ERROR_=1 _N_=3
```

What is the reason for the NOTE?

a. incorrect starting position
b. invalid date

**b. invalid date**

c. wrong informat
d. wrong variable type
4. Given the following program in the SAS log:

```sas
data new;
    set sashelp.class;
    <insert PUTLOG statement>
run;
```

Name=Alfred Sex=M Age=14 Height=69 Weight=112.5 _ERROR_=0 _N_=1
Name=Alice Sex=F Age=13 Height=56.5 Weight=84 _ERROR_=0 _N_=2

Which PUTLOG statement writes the contents of the PDV to the SAS log?

a. putlog pdv;
b. putlog _all_;
c. putlog _pdv_;
d. putlog Name= Sex= Age= Height= Weight=;
4. Given the following program in the SAS log:

```sas
   134    data new;
   135      set sashelp.class;
   136      <insert PUTLOG statement>
   137      run;
```

Which PUTLOG statement writes the contents of the PDV to the SAS log?

a. putlog pdv;

b. putlog _all_

c. putlog _pdv_

d. putlog Name= Sex= Age= Height= Weight=
5. SASHELP.CLASS contains 19 observations and 5 variables (Name, Sex, Age, Height, and Weight).

Which statement will produce a syntax error?

a. set sashelp.class(in=C);

b. set sashelp.class(obs=8 firstobs=5);

c. set sashelp.class(rename=Name Student);

d. set sashelp.class(keep=Height Name Sex);
5. SASHELP.CLASS contains 19 observations and 5 variables (Name, Sex, Age, Height, and Weight).

Which statement will produce a syntax error?

a. set sashelp.class(in=C);

b. set sashelp.class(obs=8 firstobs=5);

c. set sashelp.class(rename=Name Student);

d. set sashelp.class(keep=Height Name Sex);
6. Given the following SAS log:

```sas
224  data new;
225     input Month Year;
226     datalines;

NOTE: Invalid data for Month in line 227 1-3.
RULE:  ----+-----1----+-----2----+-----3----+-----4----+-----5----
227     JAM 2017
Month=. Year=2017 _ERROR_=1 _N_=1
```

What is the cause of the NOTE?

a. The starting position of Month is missing.

b. JAM is a misspelled month, should be JAN.

c. A width needs to be specified for the value of Month.

d. Month is being read as numeric instead of character.
6. Given the following SAS log:

```sas
224  data new;
225     input Month Year;
226     datalines;

NOTE: Invalid data for Month in line 227 1-3.
RULE: --------1--------2--------3--------4--------5----
227        JAM 2017
Month=. Year=2017 _ERROR_=1 _N_=1
```

What is the cause of the NOTE?

a. The starting position of Month is missing.
b. JAM is a misspelled month, should be JAN.
c. A width needs to be specified for the value of Month.
d. **Month is being read as numeric instead of character.**
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Exam Registration: pearsonvue.com/sas
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Michele.Ensom@sas.com
Q&A

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