IT 433 – Final Exam

June 9, 2014

Part A: Multiple Choice Questions about SAS. Circle the most correct answer for each question. You may give an optional reason for each answer; if the answer is correct, the reason will not be considered. Give a reason for possible partial credit if you are not sure of your answer. 5 points each. Do all 20 questions.

1. Which of the following SAS statements reads the next observation from a permanent dataset into the currently executing dataset?
   a. `input pets.dogs;` b. `load pets.dogs;`
   c. `read pets.dogs`; d. `set pets.dogs;`

2. Which statement is executable in a SAS data step? (The opposite of executable is declarative.)
   a. `drop` b. `input` c. `label` d. `retain`

3. What does `+3` do in a SAS data step?
   a. Adds 3 to the most recently modified variable.
   b. Moves the column pointer 3 columns to the right.
   c. Moves the column pointer to column 3.
   d. Skips 3 lines.

4. What is an encoding?
   a. An encryption system that prevents unauthorized access to SAS permanent datasets.
   b. A representation of each character in a text file with a sequence of binary bits.
   c. The representation of data in a SAS permanent dataset.
   d. The representation of a floating point value in a SAS permanent dataset.

5. Which `x` variable has a value of `1` at the end of an input file?
   a. `end = x` b. `obs = x` c. `eof = x` d. `lastobs = x`

6. Which of the following indicates a character variable of length 8 in list style input, if the length of the variable is not changed.?
   a. @ b. `$` c. `$8.` d. `$CHAR8.`

7. What is the concatenation operator in SAS?
   a. `&` b. `+` c. `||` d. `%%`

8. What is the name for a dataset in a dataset step if no actual dataset is to be generated?
   a. `default` b. `empty` c. `missover` d. `_null_`

9. If the dataset **one** contains 15 observations and the dataset two contains 12 observations, how many observations do the datasets combined1 and combined2 contain, respectively, after these data steps execute?

```
data combined1;
   set one;
   set two;
```

```
data combined2;
   set one two;
```

a. 12; 15 b. 12; 27 c. 15; 27 d. 27; 12

10. The following SAS data step is executed.

```
data testds;
   do i = 1 to 3;
      input x y @;
      output;
   end;
datalines;
3 5  2 1  4 2  3 5
```

How many observations are in the resulting dataset **testds**?

a. **1** b. **2** c. **3** d. **4**

11. What is the value of date in the SAS dataset testdate?

```
data testdate;
   date = '3feb1960'd;
   date = date + 2;
```

a. 2 b. 4 c. 35 d. 36

12. The following SAS data step is submitted:

```
data test;
infile 'c:\mydata.dat' dlm='$' dsd ;
input accnum $ fname $ lname $;
```

What does **dsd** mean in the infile statement?

a. Do not treat **$** characters as part of the data fields, instead treat them as delimiters.

b. If a data value is specified in quotes with embedded **$** characters, treat it as part of the data field.

c. Treat a data value delimited by two **$** characters as character data.

d. Treat two consecutive **$** characters as a missing value for the variable read.

13. Which statement defines the array variable population in a dataset?

a. `array population(50) 10.;`

b. `array float population[50];`

c. `array opulation{50};`

d. `array population{50} state1-state30 city1-city20;`

14. The datafile **'c:\mydata.dat'** contains account number, the first name, and the last name of account holders. Here are the first three lines of this data file:

```
122232 Craig Smith
142434 Thomas
152535 Dan Paul
```

Which data step below correctly reads the data in the input file into the dataset test?

a.
```
data test;
     infile 'c:\mydata.dat';
     input accnum $ fname $ lname $;
```

b.
```
data test;
     infile 'c:\mydata.dat' truncover;
     input accnum $ fname $ lname $;
```

c.
```
data test;
     infile 'c:\mydata.dat' missover;
     input accnum $ 1-6 fname $ 8-12 lname $ 14-18;
```

d.
```
data test;
     infile 'c:\mydata.dat' truncover;
     input accnum $ 1-6 fname $ 8-12 lname $ 14-18;
```

15. The following SAS program is submitted:

```
proc format;
   value score 1 - 50 = 'Fail'
               51 - 100 = 'Pass';
```

Which print procedure uses this format correctly?

a.
```
proc print data = district12.class;
     var test;
     format test score;
```

b.
```
proc print data = district12.class;
     var test;
     format test score.;
```

c.
```
proc print data = district12.class format = score;
     var test;
```

d.
```
proc print data = sasuser.class format = score.;
     var test;
```

16. Which SQL procedure program deletes the data set one?

a.
```
proc sql;
     drop table one;
```
b.
```
proc sql;
     remove table one;
```
c.
```
proc sql;
     delete table one;
```
d.
```
proc sql;
     delete from one;
```

17. The following proc sql is executed:

```
proc sql;
   select gender, mean(age)
   from patients
   where admit_date < '1apr2014'd
   group by gender;
```

What are the equivalent statements in traditional SAS if the observations are not assumed to be sorted by gender?

a.
```
proc means data = patients mean;
    where admit_date < '1apr2014'd;
    by gender;
    var age;
```
b.
```
proc means data = patients;
    where age < '1apr2014'd;
    class age;
    var age;
```
c.
```
proc means data = patients;
    where age < '1apr2014'd;
    sort by age;
    var age;
```
d.
```
proc means data = patients;
    where age < 18;
    sort by gender;
    var age mean;
```

18. Which procedure assigns a dataset variable value to a macro variable?

a. **%let** b. **macro_assign** c. **%set** d. **symput**

19. The following statements are executed:

```
data phone_nums;
   merge patients doctors;
      by doc_id;
      keep patient_name doc_name doc_phone;
proc sort;
   by patient_name;
proc print data = phone_nums;
```

How are these statements written using proc sql?

a.
```
proc sql;
    select patient_name, doc_name, doc_phone from patients, doctors
       where patients.doc_id = doctors.doc_id order by patient_name;
```

b.
```
proc sql;
    select patient_name, doc_phone from patients, doctors
       where patients.docid = doctors.docid;
```

c.
```
proc sql;
    select patient_name, doc_name, doc_phone from patients, doctors
       where doc_id = doc_id order by patient_name;
```

d.
```
proc sql;
    select patient_name, doc_name, doc_phone from patients, doctors
       order by patient_name;
```

20. The following program is submitted

```
%let a = cat;
%let dsname = _null_;
%macro animal(a = frog, dsname = );
   data _null_;
      file 'test.txt';
      animal_type = "&a";
      put animal_type;
%mend;
%let a = bird;
%animal(a = &a, dsname = _null_)
```

What is written to the output file test.txt?

a. **&a** b. **bird** c. **cat** d. **dog** e. **frog**

Part B: Multiple Choice Questions about R. Circle the most correct answer for each question. You may give an optional reason for each answer; if the answer is correct, the reason will not be considered. Give a reason for possible partial credit if you are not sure of your answer. 5 points each. Do all 20 questions.

21. What does the function call **`numeric(0)`** return?
    a. **`[1] 0`** b. A numeric vector of length 0. c. **`[1] FALSE`** d. **`[1] TRUE`**

22. What is the result of evaluating: **`0 / 0`**
    a. **`[1] Inf`** b. **`[1] NA`** c. **`[1] NaN`** d. **`[1] NULL`**

23. What is the return value from **`as.logical(0)`**?
    a. **`[1] FALSE`** b. **`[1] NA`** c. **`[1] TRUE`** d. A logical vector of length 0.

24. What does the function call **`c(3, "3", TRUE)`** return?
    a. **`c(3, "3", TRUE)`** b. **`c("3", "3", "1")`**
    c. **`c("3", "3", "TRUE")`** d. **`c(3, "3", TRUE)`**

25. What is the output?
```
print(apply(rbind(diag(c(1, 7, 13)), diag(3)), 2, sum))
```
    a. **`[1] 1 4 7`** b. **`[1] 1 7 13 1 1 1`** c. **`[1] 2 8 14`** d. **`[1] 24`**

26. What is printed?
```
print(substr(c("elephant", "rhinocerous"), c(2, 5), c(5, 7)))
```
    a. **`[1] "an" "oceous"`** b. **`[1] "e" "r"`**
    c. **`[1] "leph" "oce"`** d. **`[1] "lepha" "ocerous"`**

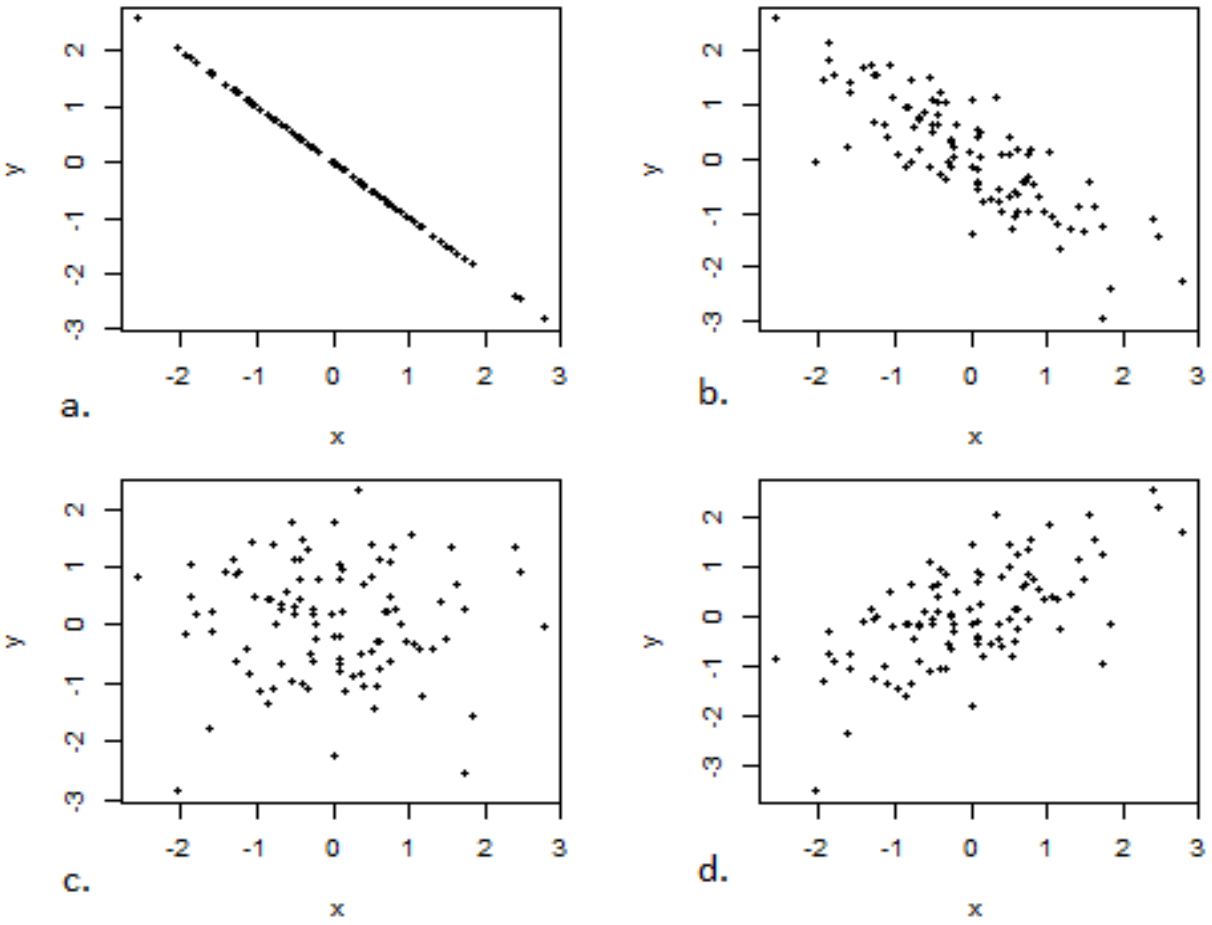
27. (This problem may be confusing; do the best you can.) The functions **`f`** and **`g`** are defined as follows:
```
f <- function(a) {
   return (function(h) { return(h(a)) } )
}
g <- function(y) { return(2 * y + 5) }
```
    What is printed?
```
print(f(6)(g))
```
    a. **`[1] 10`** b. **`[1] 11`** c. **`[1] 17`** d. Error, **`h`** not found.

28. Which function is used to remove one or more objects from the R workspace?
    a. **`delete`** b. **`detach`** c. **`remove`** d. **`rm`**

29. What does the **`System.time`** function return?
    a. A data frame b. A vector with named components
    c. A matrix d. A vector with one floating point value.

30. Which plot could plausibly be produced by this script?

```
x = rnorm(100)
u = rnorm(100)
y = (-0.8) * x + sqrt(1 - (0.8 ** 2)) * u
plot(x, y, pch=20)
```



31. The following object is defined:

```
obj <- list(a=c(1, 2, 3), c("a", "b"), b=c(TRUE, FALSE, FALSE))
```

Which of the following returns `[1] FALSE` ?

a. `obj$a[1]`
b. `length(obj[[2]]) == 2`
c. `is.logical(obj[[2]])`
d. `is.list(obj)`

32. If `df` is a data frame object with 5 rows, which expression selects rows 1, 2, and 5 from `df`?

a. `df[ ,c(-2, -3)]`
b. `df[c(-3, -5), ]`
c. `df[c(T, T, F, F, T), ]`
d. `df[ ,c(T, T, T, F, F)]`

33. What is printed by `print(qunif(0.75, 5, 9))` ?

a. `[1] 3` b. `[1] 6` c. `[1] 7.5` d. `[1] 8`

34. What is printed by `print(pnorm(-2))` ?

a. `[1] 0.02275013` b. `[1] 0.04550026`
c. `[1] 0.9544997` d. `[1] 0.9772499`

35. Which is the most plausable return value from `mean(rexp(1000, 2))` ?

a. `[1] 0.5` b. `[1] 0.5052291`
b. `[1] 1.981683` d. `[2] 2`

36. The following script is executed?

```
df <- data.frame(x=c(3, 4, 3, 2, 3, 1),
   s=c(1, 2, 1, 2, 1, 2), t=c(1, 1, 1, 2, 2, 2))
print(aggregate(df$x, df[, -1], FUN=mean))
```

What is printed?

a.

```
  s t   x
1 1 2 3.0
2 1 2 4.0
3 1 2 3.0
4 1 2 1.5
```

b.

```
  s t x
1 1 1 4
2 2 1 6
3 1 2 6
4 2 2 4
```

c.

```
  s t   x
1 1 1 3.0
2 2 1 4.0
3 1 2 3.0
4 2 2 1.5
```

d.

```
  s t x
1 1 1 6
2 2 1 8
3 1 2 6
4 2 2 3
```

37. Which of the following causes four R plots to be plotted on each page?

a. `mfrow(2, 2)` b. `par(mfrow(2, 2))`
c. `par(mfrow(c(2, 2))` d. `par(mfrow = c(2, 2))`

38. The following R statement is executed:

```
print(x)
```

This output is printed:

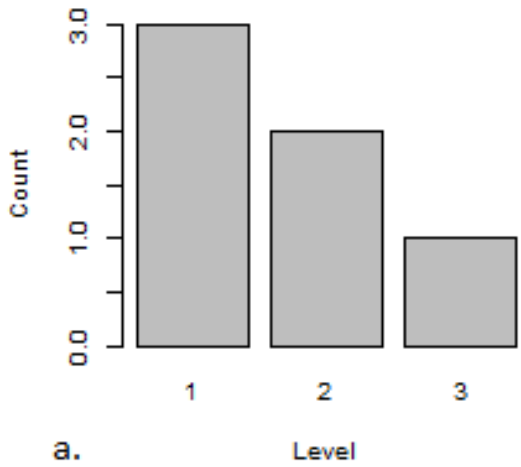
```
[1] A E D
Levels: A B C D E
```

What kind of object is x?

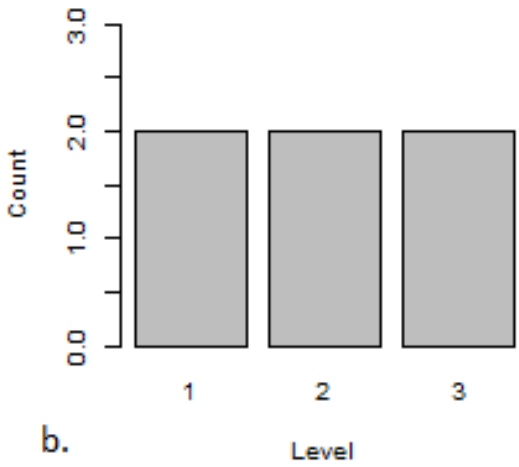
a. `character` b. `data.frame` c. `factor` d. `ts`

39. What is plotted?

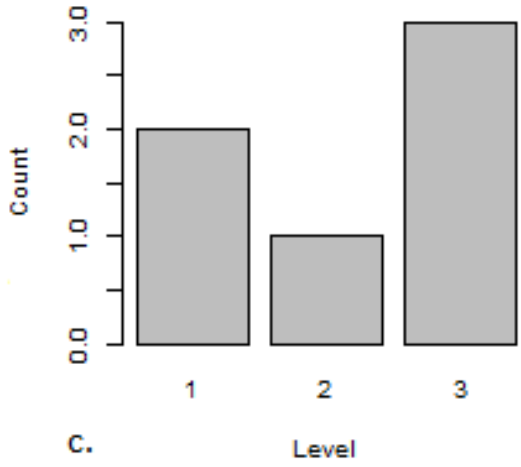
```
a <- c(2,  1,  3,  1,  2,  2)
barplot(table(a), xlab="Level", ylab="Count", ylim=c(0, 3))
```



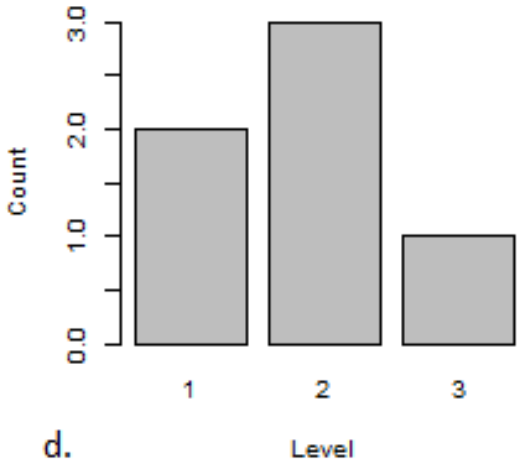
a.



b.



c.

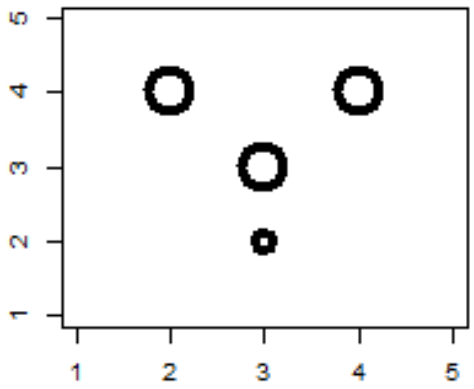


d.

40. The following R statements are executed:

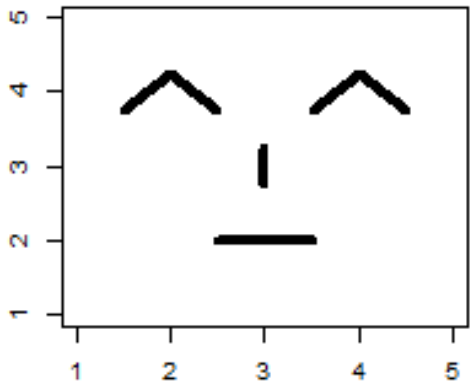
```
plot(1, 1, xlim=c(1, 5), ylim=c(1, 5), type="n", xlab="", ylab="")
x <- c(1.5, 2.0, 2.5)
y <- c(3.75, 4.25, 3.75)
lines(x, y, lwd=4)
x <- c(3.5, 4, 4.5)
y <- c(3.75, 4.25, 3.75)
lines(x, y, lwd=4)
x <- c(3, 3)
y <- c(2.75, 3.25)
lines(x, y, lwd=4)
x <- c(2.5, 3.5)
y <- c(2, 2)
lines(x, y, lwd=4)
```

What is the resulting plot?



a.

b.



c.

d.