CSE142 Exam with answers

Midterm #1
October 13, 2000
Problem numbering may differ from the test as given.
Multiple choice questions were worth 5 pts. each.

All multiple choice questions are equally weighted. You can generally assume that code shown in the questions is intended to be syntactically correct, unless something in the question or one of the answers suggests otherwise.

1. **Given the following statement in a C program that has no syntax errors:**
   printf ("101%c0%c", a, 'b');

   What can you say with reasonable certainty about this?

   A. a must be a character variable (if a were not of type char, there would be a syntax error)
   B. 'b' is a character variable
   C. This will display
   101a0b
   D. This will display 6 characters, but you don't know what they all are.
   E. The percent symbol (%) will appear in the output
   ANSWER: **D**

2. **You are modifying a program someone else wrote. The original programmer used a variable called "month" to store a number (1-12) representing the current month of the year. You wish to change the variable so that instead of a number it contains only the first character of that month's name (example: 'J' for January, etc.).**

   What is the most likely type modification you will make to the program?

   A. Change double to int
   B. Change int to letter
   C. Change number to char
   D. Change double to char
   E. Change int to char
   ANSWER: **E**

3. **Consider the function below, and then determine what value would be returned for the call:**
   f(27)

```
int f(int x) {
   if (x%2 == 0) return x;
   else return 0;
}
```

   A. 0
   B. 1
   C. 2
   D. 5
   E. 27
   ANSWER: **A**

4. Suppose you write this function as part of your program. The compiler gives you a warning or error on lines A and B. Why?

```
void puzzler (int qmark) {
    if (qmark == 1)
       return (3.0);     /* line A */
   else
       return (2.0);     /* line B */
}
```

A. The function has a void parameter list.

B. The function has a void return type.

C. The values returned should be 2 and 3, not 2.0 and 3.0.

D. It is not legal to have parentheses following return.

E. It is not legal to have more than one return statement in a function.

ANSWER: **B**

5. Suppose you wrote the following program:

```
#include <stdio.h>

int main(void)
{
  int x = 3, y;

  printf("x times y is %d\n", x * y);
  return 0;
}
```

Which of the following statements is true:

A. The program would not compile because y is an undefined variable.

B. The program would not compile (that is, it would have syntax errors) because y is never initialized.

C. While running, the program would stop when it reaches the printf because y is uninitialized.

D. The program would print out "x times y is 0", because y is automatically initialized to 0.

E. The program would print out some random number as the value of x * y
It might be 0, it might not be.

ANSWER: **E**

6. What is the value of this expression in C?

1 + 2 / 3 * 4 + 1

A. 2

B. 3

C. 4

D. 4.6666...

E. 5

ANSWER: **A**

7.

```
void TestFunction (int i, double d) {
...
}

int main (void) {
  int ivalue1, ivalue2;
  double mainDouble;
...
  /* line A */
...
} /* end of main */
```

Which of the following would be a (syntactically) correct statement to insert at line A in order to call TestFunction?

A. ivalue1 = TestFunction (ivalue2, mainDouble);
B. TestFunction (0, 2.0);
C. TestFunction (ivalue1, mainDouble) = void;
D. TestFunction (int i, double d);
E. All of the above choices are correct syntactically; which one should be used depends upon the logic of the program.

ANSWER: **B**

8. Among the choices given, the best description of an "algorithm" is...

A. a value stored in memory
B. an instruction which the CPU can execute
C. a series of steps for solving a problem
D. a mathematical equation
E. a combination of operators and operands

ANSWER: **C**

9. "Control flow" refers best to...

A. the movement of data into or out of the memory
B. the use of placeholders to control the type of data processed
C. the steps to be followed when solving a problem
D. the order in which statements of a program are executed
E. the process of compiling, linking, and executing a program

ANSWER: **D**

10. **if (a == b) {**

```
/* what could go here? */

}
```

What can be said about what could go inside a compound statement such as the one shown above?

I. There could be any number of statements, including 0 (no statements at all)
II. There could be any kind of statement except a function call
III. There could be any kind of statement except another "if" statement

A. I only
B. II only
C. III only
D. I and III (only)
E. None of I, II, or III
ANSWER: **A**

11. **double price;**

```
...
scanf ("%d", price);
```

The programmer actually intended to write
scanf ("%lf", &price);

How should this be viewed?

I. Using %d is a syntax error
II. Using %d is a semantic error
III. Omitting & is a syntax error
IV. Omitting & is a sematic error
V. These are not errors, but just matters of style

A. I and III
B. II and IV
C. I and IV
D. II and III
E. V
ANSWER: **B**

12. **The following code executes, with x having a value of 20 and y having a value of 21. What is printed?**

```
    if (x-y > y) {
        if (x >= 3*y)
            printf ("a");
        else {
            if (x > 2*y)
                printf ("b");
            printf ("c");
        }
    }
    else {
        printf ("x");
        if (x+y <= x*2) {
            printf ("d1");
            if (y < 0)
                printf ("d2");
            printf ("y");

        }
        else
            if (x == y)
                printf ("f");
            printf ("g");
    }
    if (x != 0)
        printf ("i");
}
```

A. xd1ygi
B. ai
C. xgi
D. bci
E. x

ANSWER: **C**

13. (worth 3 M.C. questions) Write a function which takes three integer parameters, computes their average as a double, and prints the average. This function does not return a value.

[Note: 15 points. Graded on correctness only]

```
/************************* sample solution ******************/

void printAverage(int a, int b, int c){
   double ave;

   ave = (double)(a + b + c) / 3.0;
   printf("%f", ave);
}
```

14. (worth 4 M.C. questions) Write a program for Sales Tax Computation. The program should prompt the user for a value, read it in (as a double), compute the sales tax, and print out the original amount, the sales tax, and the amount including the sales tax. You may print the results as doubles (you do not need to format the output to a fixed precision). For this problem, assume that the sales tax rate is 8.9%.

Your program will be graded both for correctness and for programming style. It should be a complete, compilable program, and not just a function or program fragment.

```
#include <stdio.h>
```

[Note: 20 points.]

```
/************************* sample solution ******************/

#include <stdio.h>

#define TAX_RATE 0.089

int main(void){
  double amount;
  double tax;
  double total;

  printf("\nEnter the taxable amount: ");
  scanf("%lf", &amount);

  tax = amount * TAX_RATE;
  total = amount + tax;

  printf("\nAmount: %f  Tax: %f  \nAmount with Tax %f\n", amount, tax, total);

  return 0;
}
```

15. (worth 2 M.C. questions) Fill in the body of the following function that takes three integer parameters: hours, minutes, and seconds and then computes and returns (without printing) the total number of seconds.

```
#define SECONDS_PER_MINUTE  60
#define MINUTES_PER_HOUR    60

/* Convert hours, minutes, and seconds to the total number of seconds */
int totalSeconds(int hours, int minutes, int seconds) {


}
```

[Note: 10 points. Graded only on correctness]

```
/************************* sample solution ******************/

#define SECONDS_PER_MINUTE  60
#define MINUTES_PER_HOUR    60

/* Convert hours, minutes, and seconds to the total number of seconds */
int totalSeconds(int hours, int minutes, int seconds){
  int total_minutes;
  int total_seconds;

  total_minutes = hours * MINUTES_PER_HOUR + minutes;
  total_seconds = total_minutes * SECONDS_PER_MINUTE + seconds;
  return total_seconds;
}
```