

CISC 105 sections 018-021 (Conrad) Midterm October 06, 2004

Name _____

Circle one:

Freshman Sophomore Junior Senior Other

Please circle your section number (refer to table below if you are not sure):

018 019 020 021

General Instructions

- DO NOT WRITE YOUR NAME ON ANY PAGE EXCEPT THIS ONE!
- You have 50 minutes
- **Pace Yourself!!!!**

Pay attention to the point values. When there are 10 minutes left, skim through and be sure you have at least written *something* for the questions that are worth many points.

- Read *all* the directions *carefully* on each problem.
- Good luck.

Multiple Choice

NOTE: You may want to work on the programming questions first—since they are worth more points, and will require more time—and come back to the multiple choice at the end.

The programming questions start with number 18.

1. (2 pts) Which of the following tests whether x is odd?

(a) `if (x % 2 = 0)` (b) `if (x % 2 == 0)` (c) `if (x % 2 = 1)`

(d) `if (x % 2 == 1)` (e) `if (x / 2 == 1)`

2. (2 pts) How many operands does a ternary operator have

(a) none (b) one (c) two (d) three

3. (2 pts) Which of the following is *both* a logical operator and a unary operator?

(a) `||` (b) `&&` (c) `++` (d) `!`

4. (2 pts) Each of the relational operators in C also happens to be this kind of operator:

(a) unary (b) binary (c) ternary (d) assignment

5. (2 pts) What type of C variable is used with the conversion specifier `%d`?

(a) `printf` (b) `float` (c) `int` (d) `double`

6. (2 pts) If you had the following lines of code in a C program:

```
int score;
FILE *studentFile;
studentFile = fopen("students.dat", "r");
```

then which of the following is a *correct* line of code you might expect to find later in that same program?

(a) `fscanf("%d", &score);`

(b) `fprintf(studentFile, "%d", score);`

(c) `fscanf(studentFile, "%lf", &score);`

(d) `fscanf(studentFile, "%d", &score);`

(e) `fscanf(studentFile, "%d", score);`

7. (2 pts) Which of the following is a correct conversion specified for a variable of type `double`, with 5 spaces before the decimal point, and two afterwards?

(a) `%8.2lf` (b) `%5.2d` (c) `%7.2lf` (d) `%5.2lf` (e) `%8.2d`

8. (2 pts) Which of the following tests whether x is equal to 10?

(a) `if (x == 10)` (b) `if (x = 10)` (c) `if (x?10:0)`

9. (2 pts) Which expression means the *opposite* of $x < 0$?

(a) $x > 0$ (b) $x >= 0$ (c) $x == 0$

10. (2 pts) Given the number 11111 in binary, what is the equivalent in decimal?

(a) 15 (b) 16 (c) 21 (d) 31 (e) 32

11. (2 pts) Given the number 11111111 in binary, what is the equivalent in octal?

(a) 777 (b) 377 (c) 773 (d) 333 (e) 8

12. (2 pts) Which of the following assigns the value of 2 times y to x?

(a) `x == 2 * x;` (b) `2 * y = x;` (c) `x = 2 x y;` (d) `x = 2 * y;`

13. (2 pts) In the expression 1111000×2^{10010} , which part is the mantissa?

(a) 1111000 (b) \times (c) 2 (d) 10010

14. (2 pts) The C statement `x = x / 2;` is equivalent to which of the following statements?

(a) `x /= 2;` (b) `x += 2;` (c) `x = 2;` (d) `x = 2 / x ;`

15. (2 pts) The C expression `(25 % 8)` evaluates to which of the following:

(a) 0 (b) 1 (c) 2 (d) 3 (e) 4

16. (2 pts) The C expression `(4 % 50)` evaluates to which of the following:

(a) 0 (b) 2 (c) 4 (d) 12 (e) 50

17. (2 pts) The C expression `(50 / 4)` evaluates to which of the following:

(a) 12 (b) 12.5 (c) 13 (d) 50

C Programming

18. (30 pts) Write a C program to solve the following problem.

(based in part on problem 3.10 in Tan and D’Orazio).

The period of one swing of a simple pendulum is given by:

$$T = 2\pi\sqrt{\frac{\ell}{g}}$$

T = period (seconds)

where: ℓ = length of pendulum (meters)

g = gravitational acceleration (9.81 m/sec^2)

Write a complete C program that does all of the following steps. The program should be designed to be interactive; that is, to interact with a human user.

- Ask the user to enter the length of a pendulum.
- If the length entered is less than or equal to zero, print an error message and end the program immediately.
- Calculate the period of the pendulum.
- Print a message with the resulting period.

Be sure your program contains appropriate comments and all necessary statements to be a complete C program, ready to compile. Use “constant macros” the value of the gravitational acceleration, and for π . You may use the value $\pi = 3.14159$. You may use the `sqrt()` function from the math library. Be sure to add the necessary statement at the top of your program that is needed when using the math library.

Extra space in case you need it.

19. (10 pts) Write a C function (just a C function, not a complete program) called `maxOfThree` that takes three integers as parameters, and returns the maximum of those three integers.

Optional: If it will help you, you may write a function `maxOfTwo` first, and then write `maxOfThree` in terms of the `maxOfTwo` function. However, that is not required, nor will it earn you extra credit. It is just an option that you have.

Unix Commands

20. Suppose you have a C program in a file named `lab02.c`
What Unix command do you enter to perform each of the following operations?
- (a) (2 pts) Enter a text editor to make changes to the program

 - (b) (2 pts) Display the contents of the source code on your screen.

 - (c) (2 pts) Compile the program

 - (d) (2 pts) Copy the program to a new file called `lab02a.c`.

Number Conversions

21. (4 pts) Convert 357 from decimal to binary

22. (4 pts) Convert 1010 1100 1010 1011 0100 1101 1010 1101 from hexadecimal to binary

