

CS 1044 Introduction to Programming in C Final Exam Form A

Wednesday, December 18, 1996

Instructions:

- Print your name in the space provided below.
- Print your name and ID number on the Opscan form.
- Be sure to code your ID number and to enter and code Form **A** on the Opscan form.
- Choose the single best answer for each question — some answers may be partially correct.
- Unless a question involves determining whether given C++ code is syntactically correct, assume that it is. The given code has been compiled and tested, except where there are deliberate errors.
- Note that questions about printed values disregard formatting completely.
- Be careful to distinguish integer values from floating point values (containing a decimal).
- Also note that single quotes are used to denote a character value (e.g., 'm').
- When you have completed the test, sign the pledge at the bottom of this page and turn in both the test and your Opscan.
- **Note that failure to return this test or to discuss its content with a student who has not taken it is a violation of the Honor Code.**
- There are 50 equal-valued questions.
- I suggest you mark your answers on your test sheet as well as the Opscan form for your future reference. In any case, the answers you mark on the Opscan form will be considered your official answers.

Do not start the test until instructed to do so!

Name _____

Pledge: On my honor, I have neither given nor received unauthorized aid on this examination.



- 1) Which of the following tasks are carried out by the compiler and linker?
- | | |
|--|--------------------------------------|
| 1) checking the syntax of your source code | 2) producing an executable (program) |
| 3) checking the logic of your program design | 4) all of the above |
| 5) 1 & 2 only | 6) 1 & 3 only |
| 7) 2 & 3 only | 8) None of the above |
-
- 2) In the C language, what is the value of the expression: $19 / 5$
- | | | | |
|---------------------------------------|----------------------|------|------|
| 1) 3.8 | 2) 3.0 | 3) 4 | 4) 3 |
| 5) The expression is not allowed in C | 6) None of the above | | |
-
- 3) In the C language, what is the value of the expression: $4.8 + 3$
- | | | | |
|---------------------------------------|----------------------|--------|------|
| 1) 7 | 2) 7.0 | 3) 7.8 | 4) 8 |
| 5) The expression is not allowed in C | 6) None of the above | | |

For questions 4 and 5, select the value that will be assigned to the relevant variable or indicate that the assignment is not allowed (i.e., syntax error).

- 4) `int AnInt = 5.0 / 2.0;`
- | | | | |
|-------------------------------------|----------------------|--------|------|
| 1) 2 | 2) 2.0 | 3) 2.5 | 4) 1 |
| 5) The statement is not legal in C. | 6) None of the above | | |
- 5) `char aChar = "Fred";`
- | | | | |
|-------------------------------------|----------------------|---------|-----------|
| 1) 'F' | 2) "F" | 3) Fred | 4) "Fred" |
| 5) The statement is not legal in C. | 6) None of the above | | |

Questions 6 and 7 use as standard input `cin` the stream: `9 7 .A4`

and the program:

```
#include <iostream.h>
void main( ) {
    int    i1 = 1, i2 = 3;
    char   c1 = 'u';
    cin >> i1 >> i2 >> c1;
    cout << i1 << i2 << c1;
}
```

- 6) What value is output for `i2`?
- | | | | |
|---------------------------|----------------------|------|------|
| 1) 0 | 2) a space: ' ' | 3) 7 | 4) 2 |
| 5) Not enough information | 6) None of the above | | |
- 7) What value is output for `c1`?
- | | | | |
|---------------------------|----------------------|-----------------|--------|
| 1) 'u' | 2) a period: '.' | 3) a space: ' ' | 4) 'A' |
| 5) Not enough information | 6) None of the above | | |

8) What does the following program output?

```
#include <iostream.h>
#include <iomanip.h>
void main( ) {
    float x = 1.2;
    cout.setf(ios::fixed, ios::floatfield);

    cout << "x squared is" << setw(5) << setprecision(1) << x*x;
}
```

- | | |
|----------------------|-------------------------|
| 1) x squared is 1 | 2) x squared is 1.44 |
| 3) x squared is 1.4 | 4) x squared is 1.2*1.2 |
| 5) None of the above | |

9) Consider the program:

```
#include <iostream.h>
void main( ) {
    const int False = 0;
    int A, B, C;
    A = !False;
    B = A;
    C = False;
    if (A && B)
        cout << "First is true" << endl;
    if (A || B && C)
        cout << "Second is true" << endl;
}
```

Does it print:

- | | | |
|------------------|----------------------|---------|
| 1) First is true | 2) Second is true | 3) Both |
| 4) Neither | 5) None of the above | |

For questions 10 and 11, the file in.dat is:

123456
789012

There's a newline character immediately after the 6. Consider the following program:

```
#include <fstream.h>
#include <iostream.h>
void F1(char& ch);
void F2(char& ch);
void main( ) {
    char ch = 'm';
    F1(ch);
    cout << ch << endl;
    ch = 'm';
    F2(ch);
    cout << ch << endl;
}

void F1(char& ch) {
    ifstream infile;
    infile.open("in.dat");
    infile.ignore(5, '\n');
    infile >> ch;
    infile.close();
}

void F2(char& ch) {
    ifstream infile;
    infile.open("in.dat");
    infile.ignore(9, '\n');
    infile >> ch;
    infile.close();
}
```

}

10) What value is printed by the first `cout` statement?

- 1) '4' 2) '5' 3) '6' 4) '7' 5) None of the above

11) What value is printed by the second `cout` statement?

- 1) '5' 2) '6' 3) '9' 4) '0' 5) None of the above

12) What values are printed by the following program?

```
#include <iostream.h>
void main( ) {
    float A = 7.5f, B = 5.0f, C = 7.0f;
    if (A != B)
        A = B * C;
    else
        C = A * B;
    cout << A << " " << C;
}
```

- 1) 7.5 and 7 2) 35 and 7 3) 7.5 and 37.5 4) 35 and 37.5
5) 7.5 and 5 6) None of the above

13) What values are printed by the following program?

```
#include <iostream.h>
void main( ) {
    float A = 7.5f, B = 8.0f, C = 15.5f;
    int D;
    if (A <= B) {
        D = 0;
        A = D;
        if (C == A + B) {
            D = 1;
        }
        else {
            D = 2;
        }
        D = D * D;
    }
    else {
        D = 3;
    }
    cout << D;
}
```

- 1) 0 2) 1 3) 2 4) 3
5) 4 6) 9 7) None of the above

14) What output will the following program produce?

```
#include <iostream.h>
void main( ) {
    int score = 97;
    int rank = 8;
    if (score >= 95) {
        if (rank <= 5)
            cout << "Nice job!"; }
    else
        cout << "Good job!";
}
```

- | | | |
|-----------------|----------------------|---------------------------|
| 1) Nice job! | 2) Good job! | 3) No output is produced. |
| 4) both 1 and 2 | 5) None of the above | |

15) When we refer to the syntax of a language, like C, we mean:

- 1) the rules that determine how you combine language elements to form meaningful statements
- 2) the rules that determine which header files you must include
- 3) the rules that determine what each symbol in the language means
- 4) all of the above
- 5) none of the above

For questions 16 through 18, consider the program:

```
#include <iostream.h>
void main( ) {
    int i = 1, go = 3, val = 1;
    while (i <= 5 && go) {
        i++;
        val = 2 * val;
        go--;
    }
    cout << i << go << val;
}
```

16) What value is printed for the variable i?

- | | | | |
|------|------|------|----------------------|
| 1) 0 | 2) 1 | 3) 2 | 4) 3 |
| 5) 4 | 6) 5 | 7) 6 | 8) None of the above |

17) What value is printed for the variable go?

- | | | | |
|-------|-------|----------------------|------|
| 1) 3 | 2) 2 | 3) 1 | 4) 0 |
| 5) -1 | 6) -2 | 7) None of the above | |

18) What value is printed for the variable val?

- | | | | |
|-------|-------|----------------------|------|
| 1) 1 | 2) 2 | 3) 4 | 4) 8 |
| 5) 16 | 6) 32 | 7) None of the above | |

19) Which of the following are selection mechanisms in C++?

- | | | |
|--------------------|---------------------|----------------------|
| 1) while | 2) switch | 3) for |
| 4) if ... else | 5) all of the above | 6) 1 and 3 only |
| 7) 1, 3 and 4 only | 8) 2 and 4 only | 9) none of the above |

For questions 20 through 22, consider the program:

```
#include <iostream.h>
int Func(int x, int& y);
int Max(int a, int b);
void main( ) {
    int p = 12, q = 7, r = 0;
    r = Func(p, q);
    cout << p << q << r;
}

int Func(int x, int& y) {
    switch (x) {
        case 12: return Max(x, y);
        case 7:  y = x;
        default: x = y;
    }
    return 5;
}

int Max(int a, int b) {
    int p;
    if (a <= b)
        p = b;
    else
        p = a;
    return p;
}
```

20) What value is output for the variable p?

- | | | | |
|----------------------|------|------|------|
| 1) 12 | 2) 7 | 3) 5 | 4) 0 |
| 5) None of the above | | | |

21) What value is output for the variable q?

- | | | | |
|----------------------|------|------|------|
| 1) 12 | 2) 7 | 3) 5 | 4) 0 |
| 5) None of the above | | | |

22) What value is output for the variable r?

- | | | | |
|----------------------|------|------|------|
| 1) 12 | 2) 7 | 3) 5 | 4) 0 |
| 5) None of the above | | | |

23) In C++:

- 1) It is illegal to place the definition of one function inside the definition of another function.
- 2) It is illegal to place the prototype of one function inside the definition of another function.
- 3) Both 1 and 2 are true.
- 4) None of the above

For questions 24 through 29 consider the program:

```
#include <iostream.h>
int i1 = 5; // line 1
int i2 = 7; // line 2
int i3 = 9; // line 3
char c1 = 'x'; // line 4
char c2 = 'y'; // line 5
void F(int& i1, char& c2);
void G(int& i3, char& c2);
void main( ) {
    char c1 = 'm'; // line 6
    F(i1, c1);
    cout << i1 << c1 << endl; // line 7
    i1 = 25;
    c1 = 'r';
    G(i1, c1);
    cout << i1 << c1 << endl; // line 8
}
void F(int& i1, char& c2) {
    i1++; // line 9
    c2 = 'p'; // line 10
}
void G(int& i3, char& c2) {
    int i1 = 2; // line 11
    if (i3 > 10) {
        int i3 = 0; // line 12
        c2 = 'Q'; // line 13
    }
    i1 = i1 * i3; // line 14
}
```

- 24) What is printed for the variable `i1` when the `cout` statement in line 7 is executed?
- 1) 5 2) 6 3) 7 4) None of the above
- 25) What is printed for the variable `c1` when the `cout` statement in line 7 is executed?
- 1) 'p' 2) 'm' 3) 'x' 4) None of the above
- 26) What is printed for the variable `i1` when the `cout` statement in line 8 is executed?
- 1) 0 2) 50 3) 25 4) None of the above
- 27) What is printed for the variable `c1` when the `cout` statement in line 8 is executed?
- 1) 'A' 2) 'r' 3) 'x' 4) None of the above
- 28) The variable whose value is changed in line 10 is declared in line:
- 1) 4 2) 5 3) 6 4) 10 5) None of the above
- 29) The variable whose value is changed in line 12 is declared in line:

- 1) 1 2) 3 3) 4 4) 12 5) None of the above

For questions 30 through 35, consider the (incomplete) program:

```
#include <iostream.h>
void AddEm(_____ Points[], int Size, _____ Sum);
void main() {
    const int Size = 5;
    int Points[Size] = {1,2,3,4,5};
    int Sum = -1;
    AddEm(Points, Size, Sum);
    cout << Sum;
}
void AddEm(_____ Points[], int Size, _____ Sum) { // line 1
    Sum = _____; // line 2
    for (int index = 0; _____; index++) // line 3
        _____ = Sum + _____; // line 4
}
```

This function AddEm() is intended to take three parameters, an array of integers, the dimension of that array, and an integer that will equal the sum of the array entries when the function call terminates.

30) How should the blank preceding the formal parameter Points[] in line 1 be filled?

- 1) int 2) const int 3) int& 4) const int&
5) None of the above

31) How should the blank preceding the formal parameter Sum in line 1 be filled?

- 1) int 2) const int 3) int& 4) const int&
5) None of the above

32) How should the blank in line 2 be filled?

- 1) Points[0] 2) Points 3) 0 4) Points[5]
5) None of the above

33) How should the blank in line 3 be filled?

- 1) index < Size 2) index == Size 3) index <= Size
4) index = Size 5) None of the above

34) How should the first blank in line 4 be filled?

- 1) Points[index] 2) Sum 3) index 4) AddEm
5) None of the above

35) How should the second blank in line 4 be filled?

- 1) Points[index] 2) Sum 3) index 4) AddEm
5) None of the above

36) Which of the following describes what happens when an actual parameter is passed by reference?

- 1) the value of the actual parameter is copied into the formal parameter
- 2) the value of the formal parameter is copied into the actual parameter
- 3) the formal parameter is treated as an alias or synonym for the actual parameter
- 4) the actual parameter is treated as an alias or synonym for the formal parameter
- 5) all of the above
- 6) none of the above

37) Which of the following describes what happens when an actual parameter is passed by value?

- 1) the value of the actual parameter is copied into the formal parameter
- 2) the value of the formal parameter is copied into the actual parameter
- 3) the formal parameter is treated as an alias or synonym for the actual parameter
- 4) the actual parameter is treated as an alias or synonym for the formal parameter
- 5) all of the above
- 6) none of the above

38) Consider the following (rather quiet) program:

```
void main( ) {  
    const int Dim = _____;  
    char  aName[Dim] = "NineChars";  
}
```

Which of the following value(s) could be used to fill the blank in the declaration of Dim without causing a compile-time error?

- | | | | |
|---------------------|-------------------|----------------------|----------------------|
| 1) 5 | 2) 9 | 3) 10 | 4) 15 |
| 5) all of the above | 6) 10 and 15 only | 7) 9, 10 and 15 only | 8) none of the above |

Questions 39 through 41 assume the following declarations:

```
const int Size = 4;  
float List[Size] = {0.0, 0.1, 0.2, 0.3},  
      Vector[Size] = {1.0},  
      AFloat;  
int FooBar(float Value, int Count);
```

39) The statement: `FooBar(List, Size);`

- | | |
|-----------------------------|------------------------------|
| 1) Contains a syntax error. | 2) Is syntactically correct. |
|-----------------------------|------------------------------|

40) The statement: `Vector == List;`

- | | |
|-----------------------------|------------------------------|
| 1) Contains a syntax error. | 2) Is syntactically correct. |
|-----------------------------|------------------------------|

41) The statement: `AFloat = List[2] + Vector[3];`

- | | |
|---|--|
| 1) Contains a syntax error. | 2) Assigns the value 0.2 to AFloat. |
| 3) Assigns the value 1.2 to AFloat. | 4) Assigns an unknown value to AFloat. |
| 5) Assigns a different known value to AFloat. | 6) None of the above |

Questions 42 and 43 consider the following program. Hint: `StrFunc()` searches an array of strings for a match.

```
#include <iostream.h>
#include <string.h>
int StrFunc(char Nom[]);
void main( ) {
    char First[8] = "Dick";
    char Second[8] = "Zero";
    int index = 10;
    index = StrFunc(First);
    cout << index << endl;
    index = 10;
    index = StrFunc(Second);
    cout << index << endl;
}

int StrFunc(char Nom[]) {
    char Names[3][8] = {"Tom",
                        "Dick",
                        "Harry"};
    for (int i = 0; i < 3; i++) {
        if (strcmp(Nom, Names[i]) == 0)
            return i;
    }
    return -1;
}
```

- 42) What value is printed for the variable `index` when the first `cout` statement is executed?
- 1) -1 2) 0 3) 1 4) 2 5) 3
6) None of the above
- 43) What value is printed for the variable `index` when the second `cout` statement is executed?
- 1) -1 2) 0 3) 1 4) 2 5) 3
6) None of the above

Questions 44 through 49 refer to the program that follows question 49.

- 44) What does the code in lines 1 through 4 do?
- 1) Declare file-scoped variables 2) Declare a function prototype
3) Declare a file-scoped data type 4) None of the above
- 45) What values are printed by the call to `PrintEm()`?
- 1) 2.5 and 10 2) 1.6 and 11 3) 2.5 and 11 4) 1.6 and 10
5) None of the above
- 46) Suppose the ampersands (&s) in the prototype and definition for `InitEm()` in lines 5 and 6 were omitted. Would the program still compile and produce the same results?
- 1) Yes 2) It would compile but produce different results.
3) It would not compile. 4) None of the above
- 47) Would the program still compile and produce the same results if lines 8 and 9 were replaced by:
- `Third = Fourth;`
- 1) Yes 2) It would compile but produce different results.
3) It would not compile. 4) None of the above

- 48) Would the program still compile and produce the same results (ignoring formatting) if line 10 were replaced by:

```
cout << Third;
```

- | | |
|--------------------------|--|
| 1) Yes | 2) It would compile but produce different results. |
| 3) It would not compile. | 4) None of the above |

- 49) Would the program compile and produce the same results if lines 1 through 4 were moved to be the first four lines inside main()?

- | | |
|--------------------------|--|
| 1) Yes | 2) It would compile but produce different results. |
| 3) It would not compile. | 4) None of the above |

```
#include <iostream.h>

typedef struct {                                // line 1
    float Size;                                // line 2
    int Speed;                                 // line 3
} aDrive;                                       // line 4

void InitEm(aDrive& First, aDrive& Second);    // line 5
void PrintEm(aDrive Third, aDrive Fourth);
void main( ) {
    aDrive Drive1, Drive2;
    InitEm(Drive1, Drive2);
    PrintEm(Drive1, Drive2);
}

void InitEm(aDrive& First, aDrive& Second) {    // line 6
    First.Size = 1.6;
    First.Speed = 11;
    Second.Size = 2.5;
    Second.Speed = 10;
}

void PrintEm(aDrive Third, aDrive Fourth) {
    if (Third.Size <= Fourth.Size)             // line 7
        Third.Size = Fourth.Size;             // line 8
        Third.Speed = Fourth.Speed;           // line 9
    cout << Third.Size << Third.Speed;        // line 10
}
```

-
- 50) In what order should the following steps in Polya's Four-Step Plan be carried out?

- | | |
|----------------------------|----------------------------|
| a) Devise a plan. | b) Implement the solution. |
| c) Understand the problem. | d) Test the solution. |

- | | | | |
|----------------------|---------------|------------------------------|---------------|
| 1) a, b, c, d | 2) a, c, b, d | 3) c, b, a, d | 4) b, d, c, a |
| 5) d, c, b, a | 6) c, a, b, d | 7) Any of the above will do. | |
| 8) None of the above | | | |