

Instructions: This homework assignment focuses primarily on C++ scope rules and functions. The answers to the following questions can be determined from Chapters 3 through 9 of the lecture notes and Chapters 2 through 8 of the text. Assume any `#include` directives, variable declarations, etc, which are needed to make the given code syntactically correct. Submit your answers to the Curator collection point HW5.

For questions 1 through 5, consider the following program:

```
const int LIMIT = 50;           // Line 1
int AddEm(int x, int y);      // Line 2
int main() {
    int x = 42,                // Line 3
        y = 35;               // Line 4
    int Sum;                   // Line 5

    Sum = AddEm(x, y);        // Line 6

    return 0;                 // Line 7
}
int AddEm(int x, int y) {     // Line 8
    int Total;                 // Line 9
    Total = x + y;            // Line 10
    if (Total > LIMIT)        // Line 11
        Total = 0;           // Line 12
    return (Total);           // Line 13
}
```

1. What is the scope of the identifier `Sum` which is declared in Line 5?
 - 1) Line 5 to Line 13
 - 2) Line 6 to Line 13
 - 3) Line 5
 - 4) Line 5 to Line 7
 - 5) Line 5 to Line 8
 - 6) None of these
2. What is the scope of the identifier `x` which is declared in Line 3?
 - 1) Line 3 to Line 13
 - 2) Line 4 to Line 13
 - 3) Line 3
 - 4) Line 3 to Line 7
 - 5) Line 3 to Line 8
 - 6) None of these
3. What is the scope of the identifier `x` which is declared in Line 8?
 - 1) Line 8 to Line 13
 - 2) Line 9 to Line 13
 - 3) Line 8
 - 4) Line 8 to Line 12
 - 5) Line 9 to Line 12
 - 6) None of these
4. What is the scope of the identifier `LIMIT` which is declared in Line 1?
 - 1) Line 1 to Line 13
 - 2) Line 1 to Line 2
 - 3) Line 1
 - 4) Line 3 to Line 7
 - 5) Line 8 to Line 13
 - 6) None of these
5. Which of the following are true?
 - 1) `LIMIT` is global
 - 2) `AddEm` is global
 - 3) `LIMIT` is local to `main()`
 - 4) `Sum` is global
 - 5) `x` is global
 - 6) All of them are true
 - 7) 1 and 2 only
 - 8) 2 and 3 only
 - 9) 2, 3 and 4 only
 - 10) None of these

6. Suppose the first few lines of a function are as follows:

```
void Calc( float Beta ) {
    Alpha = 3.8 * Beta;
    . . .
```

If the code compiles, then the variable Alpha must be:

- | | |
|---|------------------|
| 1) a local variable declared later in the body of Calc () | 5) 1 or 3 only |
| 2) a file-scoped or global variable | 6) 2 or 3 only |
| 3) a parameter passed to Calc () | 7) None of these |
| 4) 1 or 2 only | |
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7. Which of the following statements are true when a parameter is passed by value?

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|--|--------------------------|
| 1) The <u>actual</u> parameter is never modified by execution of the called function. | |
| 2) The <u>formal</u> parameter may or may not be modified by execution of the called function. | |
| 3) The <u>actual</u> parameter must be a variable. | |
| 4) 1, 2 and 3 are all true. | 7) Only 1 and 3 are true |
| 5) 1, 2, and 3 are all false. | 8) Only 2 and 3 are true |
| 6) Only 1 and 2 are true | 9) None of these |
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8. Which of the following statements are true when a parameter is passed by reference?

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|--|--------------------------|
| 1) The <u>actual</u> parameter must be modified by execution of the called function. | |
| 2) The <u>actual</u> parameter may or may not be modified by execution of the called function. | |
| 3) The <u>actual</u> parameter may be a variable or a constant or an expression. | |
| 4) 1, 2 and 3 are all true. | 7) Only 1 and 3 are true |
| 5) 1, 2, and 3 are all false. | 8) Only 2 and 3 are true |
| 6) Only 1 and 2 are true | 9) None of these |
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9. Which of the following statements are true when a parameter is passed by constant reference?

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|--|--------------------------|
| 1) The <u>actual</u> parameter may or may not be modified by execution of the called function. | |
| 2) The <u>actual</u> parameter must be modified by execution of the called function. | |
| 3) The <u>actual</u> parameter may be a variable or a constant or an expression. | |
| 4) 1, 2 and 3 are all true. | 7) Only 1 and 3 are true |
| 5) 1, 2, and 3 are all false. | 8) Only 2 and 3 are true |
| 6) Only 1 and 2 are true | 9) None of these |
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10. A function SomeFunc has two formal parameters, alpha and beta, of type int. The data flow for alpha is one-way, out of the function. The data flow for beta is two-way, into and out of the function. What is the most appropriate function prototype for SomeFunc?

- | | |
|---|------------------|
| 1) void SomeFunc (int alpha, int beta); | 5) 1 and 2 only |
| 2) void SomeFunc (int& alpha, int beta); | 6) 3 and 4 only |
| 3) void SomeFunc (int alpha, int& beta); | 7) None of these |
| 4) void SomeFunc (int& alpha, int& beta); | |
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