

**Checkpoint 5.1 (Please submit your answer to Moodle)**

Error(s) may include in the following sub-questions. If you think there is/are error(s), try to find out and suggest some way(s) to fix the error(s). If no error, please write “No error”.

a)

```
#include <iostream>
using namespace std;
double multiplication(double a, double b){
    int result;
    result = k * j;
    return result;
}
int main(){
    double result;
    result = multiplication(2.5, 1.5);
    cout << result << endl;
    return 0;
}
```

Ans:

Error(s): An integer variable called “result” is returned but a double-precision, floating-point result is expected.; variable k and j is undefined in the function.

Suggested correction:

Declare the variable result as “double result;”, replace “result = k \* j” with “result = a \* b”.

b)

```
#include <iostream>
using namespace std;
void a(){
    a = 8;
    void b(){
        b = 9;
        void c(){
            c = 10;
        }
    }
}

int main(){
    // calling b()
    b();
    return 0;
}
```

Ans:

Error(s): Function **b** and **c** are defined in function **a**.

Suggested correction: Move the definition of **b** and **c** out of the definition of **a** which the functions **a**, **b** and **c** are defined separately.

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### Checkpoint 5.2 (Please submit your answer to Moodle)

Write down the function prototype (without parameter names), for each of the following functions:

- a) A function called **largest** that takes four double-precision, floating-point arguments, **a**, **b**, **c** and **d**, and returns a double-precision, floating-point as the result.
- b) A function called **getPerimeter** that does not take any arguments and returns an integer as the result.
- c) A function called **setPrice** that takes a double-precision, floating-point argument, **price**, and does not return a value.

Ans:

- a) `double largest(double a, double b, double c, double d);`
  - b) `int getPerimeter();`
  - c) `void setPrice(double price);`
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### Checkpoint 5.3 (Please submit your answer to Moodle)

Student A writes the following code. However, when he compiles the code, some compilation errors are found.

```
#include <iostream>
using namespace std;
int main(){
    int y = 9;
    int x = 7;
    int i = 0;

    while (i < 3){
        if (i % 2 == 0){
            g(x);
            i++;
        }
        else{
            g(y);
            i++;
        }
    }
}

void g(int& k){
    static int num = 6;

    if (k % 2 == 0){
        num += 2;
        k = k + 6;
    }
    else{
        num -= 2;
        k = k - 6;
    }
    cout << num << ", " << k << endl;
}
```

- a) Find out the errors and suggest some ways to fix the errors.
- b) Write down the program output after you fix the errors in (a).

Ans:

- a) 1) Missing the function declaration `void g(int& k);` before calling the function in `main()`; 2) Missing `return 0` in `main()`.
- b) 4, 1  
2, 3  
0, -5

#### Checkpoint 5.4 (Please submit your answer to Moodle)

Given the following program:

```
#include <cmath>
#include <iostream>
using namespace std;
int k = 10;

void display(int m){
    cout << m << endl;
}

int main(){
    for (int j = 50; j >= 1; j--){
        if (j % 2 == 0){
            k = k + j;
        }
    }
    display(k);
    return 0;
}
```

- a) What is the scope of variable k?
- b) What is the scope of parameter m?
- c) What is the scope of variable j?

Ans:

- a) Scope of variable k : entire file
  - b) Scope of parameter m: entire display function
  - c) Scope of variable j : within the for-loop in the main function
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### Checkpoint 5.5 (Please submit your answer to Moodle)

Given the following program:

```
#include <iostream>
using namespace std;

void f(double &p, double &q, double r, double s){
    double w;
    w = q;
    q = p;
    p = w;
    r = 10 * p;
    s = 100 * q;
}

int main(){
    double a, b, c, d;
    b = 1.1;
    c = 10.1;
    a = 100.1;
    d = 1000.1;

    f(a, b, c, d);
    cout << a << "\n" << b << "\n" << c << "\n" << d << endl;
    return 0;
}
```

- a) Write down the expected program output.
- b) What would be the program output if line 4 is replaced by:  
void f(double &p, double &q, double &r, double &s) { ?

Ans:

- a) 1.1  
100.1  
10.1  
1000.1
- b) 1.1  
100.1  
11  
10010