

LAB REPORT 实验报告

Lab Title	C++ function overloading			Lab No.	14
Stud. Name		Major	CST	Class	
Student ID			Date		

Lab description/objectives:

1) Using function overloading, write a function `area()` to calculate the area of a circle, rectangular, and a trapezoid with one, two and three arguments.

2) Write another function `add()` to add two ints or two doubles or two strings.

Source code:

```
#include <iostream>
#include <string>
using namespace std;
#define PI 3.141592

double area(double radius)
{
    return radius * radius * PI;
}

double area(double length, double width)
{
    return length * width;
}

double area(double upperbase, double bottom, double height)
{
    return height * (upperbase + bottom) / 2;
}
```

```
template <typename Type_Add>
Type_Add add(Type_Add a, Type_Add b)
{
    return a + b;
}

int main(void)
{
    ios::sync_with_stdio(false);

    // Calculation of circle area
    double r;
    cout << "Please enter the radius of a circle:" << endl;
    cin >> r;
    cout << "The area of a circle with radius " << r;
    cout << " is " << area(r) << "."
        << "\n"
        << endl;

    // Calculation of rectangular area
    double l, w;
    cout << "Please enter the length and width of a rectangle:" << endl;
    cin >> l >> w;
    cout << "The area of a rectangle with length " << l;
    cout << " and width " << w;
    cout << " is " << area(l, w) << "."
        << "\n"
        << endl;

    // Calculation of a trapezoid area
```

```
double u, b, h;

cout << "Please enter the upperbase, bottom and height of a trapezoid:"
    << endl;

cin >> u >> b >> h;

cout << "The area of a trapezoid with upper base " << u;
cout << " bottom " << b << " and height " << h;
cout << " is " << area(u, b, h) << "."
    << "\n"
    << endl;

// Addition of 2 int-type numbers
int num1, num2;

cout << "Please enter 2 int-type numbers:" << endl;

cin >> num1 >> num2;

cout << num1 << " + " << num2 << " = " << add(num1, num2) << "\n" << endl;

// Addition of 2 double-type numbers
double num3, num4;

cout << "Please enter 2 double-type numbers:" << endl;

cin >> num3 >> num4;

cout << num3 << " + " << num4 << " = " << add(num3, num4) << "\n" << endl;

// Addition of 2 strings
string str1, str2;

cout << "Please enter 2 string(Seperated by SPACE or ENTER):" << endl;

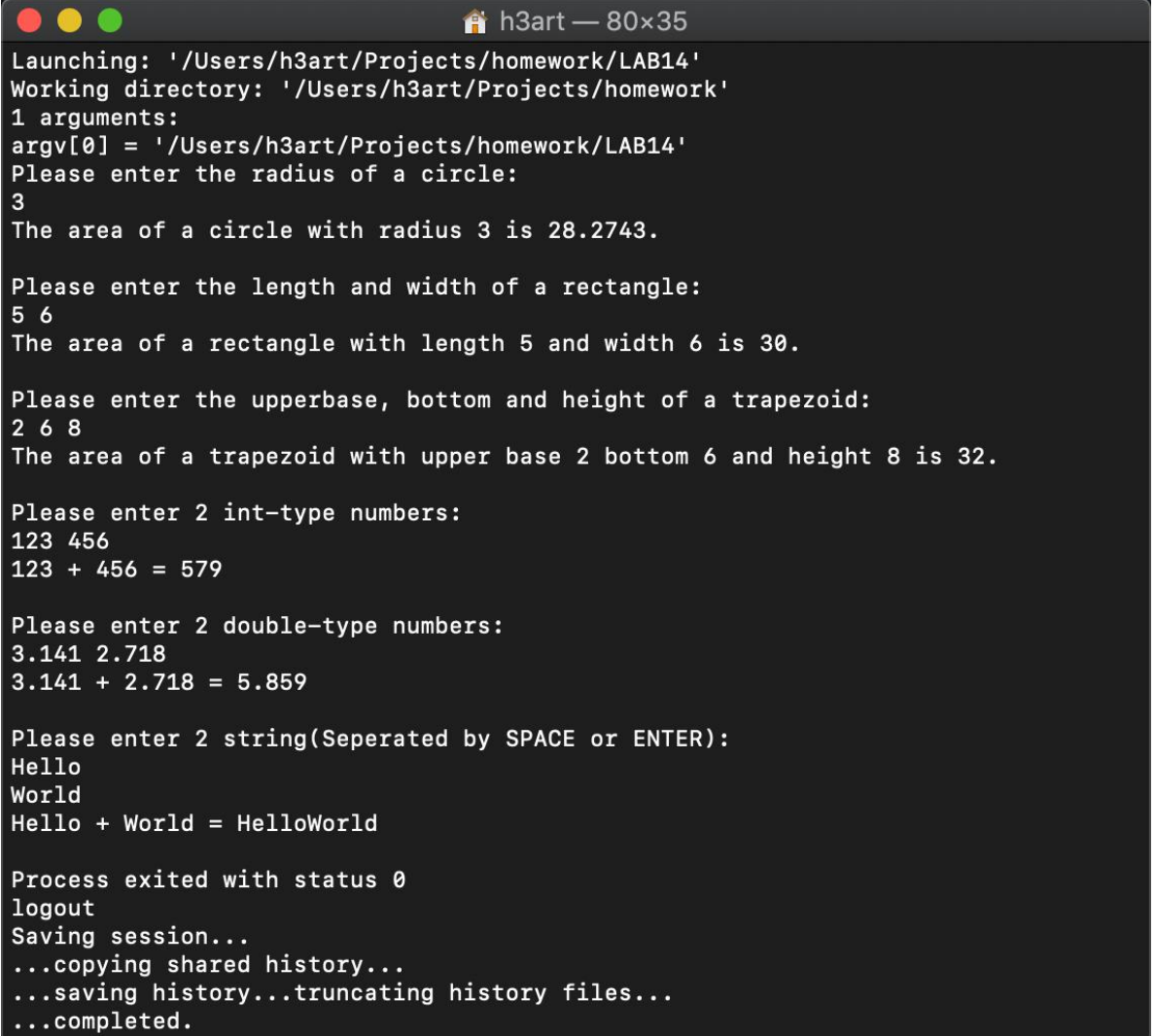
cin >> str1 >> str2;

cout << str1 << " + " << str2 << " = " << add(str1, str2) << "\n" << endl;

return 0;

}
```

Program outputs:



```
Launching: '/Users/h3art/Projects/homework/LAB14'
Working directory: '/Users/h3art/Projects/homework'
1 arguments:
argv[0] = '/Users/h3art/Projects/homework/LAB14'
Please enter the radius of a circle:
3
The area of a circle with radius 3 is 28.2743.

Please enter the length and width of a rectangle:
5 6
The area of a rectangle with length 5 and width 6 is 30.

Please enter the upperbase, bottom and height of a trapezoid:
2 6 8
The area of a trapezoid with upper base 2 bottom 6 and height 8 is 32.

Please enter 2 int-type numbers:
123 456
123 + 456 = 579

Please enter 2 double-type numbers:
3.141 2.718
3.141 + 2.718 = 5.859

Please enter 2 string(Seperated by SPACE or ENTER):
Hello
World
Hello + World = HelloWorld

Process exited with status 0
logout
Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.
```

Discussion:

1. Most difficult parts
2. Bugs and/or Errors