Menu Assignment - Robert P.

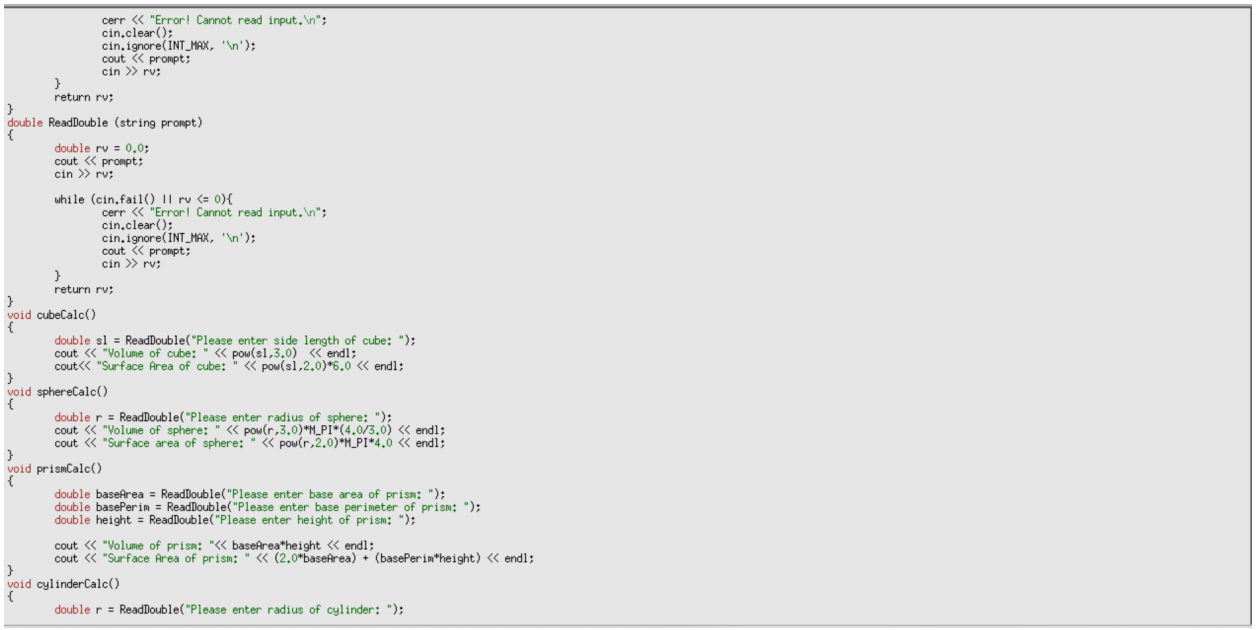
Test Outputs:

```
e_prevost@ares:~/homeworkAssignments$ g++ menu.C -o menu
e_prevost@ares:~/homeworkAssignments$ ./menu
1. Cube
2. Sphere
3. Prism
4. Cylinder
5. Cone
6. Quit
Choose a shape(1-5): 1
Please enter side length of cube: -2
Error! Cannot read input.
Please enter side length of cube: -4
Error! Cannot read input.
Please enter side length of cube: hjsdhgjsdf
Error! Cannot read input.
Please enter side length of cube: 4
Volume of cube: 64
Surface Area of cube: 96
1. Cube
2. Sphere
3. Prism
4. Cylinder
5. Cone
6. Quit
Choose a shape(1-5): 2
Please enter radius of sphere: -44444444
Error! Cannot read input.
Please enter radius of sphere: 4
Volume of sphere: 268.083
Surface area of sphere: 201.062
1. Cube
2. Sphere
3. Prism
4. Cylinder
5. Cone
6. Quit
Choose a shape(1-5): 5
Please enter radius of cone: 3
Please enter height of cone: 5
Volume of cone: 47.1239
Surface Area of cone: 83.2298
1. Cube
2. Sphere
3. Prism
4. Cylinder
5. Cone
6. Quit
Choose a shape(1-5): 239608239408239468239408234 6
Error! Cannot read input.
Choose a shape(1-5): 7
error!
1. Cube
2. Sphere
3. Prism
4. Cylinder
5. Cone
6. Quit
Choose a shape(1-5): 8
error!
1. Cube
2. Sphere
3. Prism
4. Cylinder
5. Cone
6. Quit
Choose a shape(1-5): 6
Bye!
e_prevost@ares:~/homeworkAssignments$
```

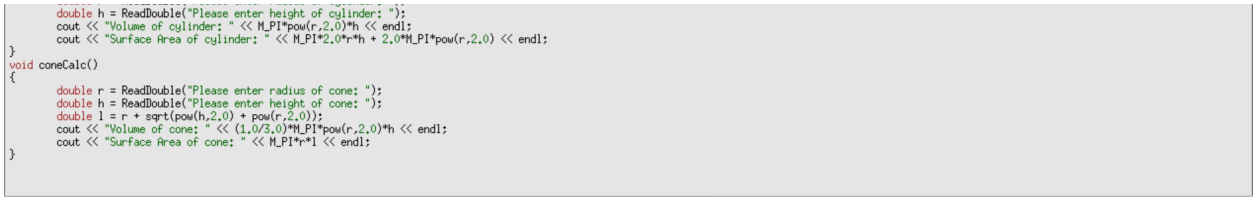
Source Code:

```cpp
/*
Code made by: Robert Prevost

Menu program that outputs the surface area and volume of each specified menu item

Updated on: 10/7/2023
*/

#include <iostream>
#include <cmath>
#include <string>
#include <climits>
using namespace std;

const int Cube = 1;
const int Sphere = 2;
const int Prism = 3;
const int Cylinder = 4;
const int Cone = 5;
const int Quit = 6;

void promptMenu(int choseVal);
int ReadInt (string prompt);
double ReadDouble (string prompt);
void cubeCalc();
void sphereCalc();
void prismCalc();
void cylinderCalc();
void coneCalc();


int main()
{
	int choseVal = 0;
	while(choseVal != Quit){
		cout << "1. Cube\n2. Sphere\n3. Prism\n4. Cylinder\n5. Cone\n6. Quit\n";
		string prompt = "Choose a shape(1-5): ";
		choseVal = ReadInt(prompt);
		promptMenu(choseVal);
	}
}

void promptMenu(int choseVal)
{
	switch(choseVal){
			case Cube:
				{
```

```cpp
					cubeCalc();
				}
				break;

			case Sphere:
				{
					sphereCalc();
				}
				break;

			case Prism:
				{
					prismCalc();
				}
				break;

			case Cylinder:
				{
					cylinderCalc();
				}
				break;

			case Cone:
				{
					coneCalc();
				}
				break;

			case Quit:
				{
					cout<< "Bye!\n";
				}
				break;
			default:
				{
					cout<<"error!\n";
				}
				break;
		}
}
int ReadInt (string prompt)
{
	int rv = 0.0;
	cout << prompt;
	cin >> rv;

	while (cin.fail()){
```



```
                cerr << "Error! Cannot read input.\n";
                cin.clear();
                cin.ignore(INT_MAX, '\n');
                cout << prompt;
                cin >> rv;
        }
        return rv;
}
double ReadDouble (string prompt)
{
        double rv = 0.0;
        cout << prompt;
        cin >> rv;

        while (cin.fail() || rv <= 0){
                cerr << "Error! Cannot read input.\n";
                cin.clear();
                cin.ignore(INT_MAX, '\n');
                cout << prompt;
                cin >> rv;
        }
        return rv;
}
void cubeCalc()
{
        double sl = ReadDouble("Please enter side length of cube: ");
        cout << "Volume of cube: " << pow(sl,3.0)  << endl;
        cout<< "Surface Area of cube: " << pow(sl,2.0)*6.0 << endl;
}
void sphereCalc()
{
        double r = ReadDouble("Please enter radius of sphere: ");
        cout << "Volume of sphere: " << pow(r,3.0)*M_PI*(4.0/3.0) << endl;
        cout << "Surface area of sphere: " << pow(r,2.0)*M_PI*4.0 << endl;
}
void prismCalc()
{
        double baseArea = ReadDouble("Please enter base area of prism: ");
        double basePerim = ReadDouble("Please enter base perimeter of prism: ");
        double height = ReadDouble("Please enter height of prism: ");

        cout << "Volume of prism: "<< baseArea*height << endl;
        cout << "Surface Area of prism: " << (2.0*baseArea) + (basePerim*height) << endl;
}
void cylinderCalc()
{
        double r = ReadDouble("Please enter radius of cylinder: ");
```



```
        double h = ReadDouble("Please enter height of cylinder: ");
        cout << "Volume of cylinder: " << M_PI*pow(r,2.0)*h << endl;
        cout << "Surface Area of cylinder: " << M_PI*2.0*r*h + 2.0*M_PI*pow(r,2.0) << endl;
}
void coneCalc()
{
        double r = ReadDouble("Please enter radius of cone: ");
        double h = ReadDouble("Please enter height of cone: ");
        double l = r + sqrt(pow(h,2.0) + pow(r,2.0));
        cout << "Volume of cone: " << (1.0/3.0)*M_PI*pow(r,2.0)*h << endl;
        cout << "Surface Area of cone: " << M_PI*r*l << endl;
}
```

Source Code Text:

```
/*
Code made by: Robert Prevost

Menu program that outputs the surface area and volume of each specified menu item

Updated on: 10/7/2023
*/

#include <iostream>
#include <cmath>
#include <string>
#include <climits>
using namespace std;

const int Cube = 1;
const int Sphere = 2;
const int Prism = 3;
const int Cylinder = 4;
const int Cone = 5;
```

```
const int Quit = 6;

void promptMenu(int choseVal);
int ReadInt (string prompt);
double ReadDouble (string prompt);
void cubeCalc();
void sphereCalc();
void prismCalc();
void cylinderCalc();
void coneCalc();


int main()
{
	int choseVal = 0;
	while(choseVal != Quit){
		cout << "1. Cube\n2. Sphere\n3. Prism\n4. Cylinder\n5. Cone\n6. Quit\n";
		string prompt = "Choose a shape(1-5): ";
		choseVal = ReadInt(prompt);
		promptMenu(choseVal);
	}
}

void promptMenu(int choseVal)
{
	switch(choseVal){
			case Cube:
				{
					cubeCalc();
				}
				break;

			case Sphere:
				{
					sphereCalc();
				}
				break;

			case Prism:
				{
					prismCalc();
				}
				break;
```

```
                        case Cylinder:
                                {
                                        cylinderCalc();
                                }
                                break;

                        case Cone:
                                {
                                        coneCalc();
                                }
                                break;

                        case Quit:
                                {
                                        cout<< "Bye!\n";
                                }
                                break;
                        default:
                                {
                                        cout<<"error!\n";
                                }
                                break;
                }
}
int ReadInt (string prompt)
{
        int rv = 0.0;
        cout << prompt;
        cin >> rv;

        while (cin.fail()){
                cerr << "Error! Cannot read input.\n";
                cin.clear();
                cin.ignore(INT_MAX, '\n');
                cout << prompt;
                cin >> rv;
        }
        return rv;
}
double ReadDouble (string prompt)
{
        double rv = 0.0;
        cout << prompt;
        cin >> rv;
```

```
	while (cin.fail() || rv <= 0){
		cerr << "Error! Cannot read input.\n";
		cin.clear();
		cin.ignore(INT_MAX, '\n');
		cout << prompt;
		cin >> rv;
	}
	return rv;
}
void cubeCalc()
{
	double sl = ReadDouble("Please enter side length of cube: ");
	cout << "Volume of cube: " << pow(sl,3.0)  << endl;
	cout<< "Surface Area of cube: " << pow(sl,2.0)*6.0 << endl;
}
void sphereCalc()
{
	double r = ReadDouble("Please enter radius of sphere: ");
	cout << "Volume of sphere: " << pow(r,3.0)*M_PI*(4.0/3.0) << endl;
	cout << "Surface area of sphere: " << pow(r,2.0)*M_PI*4.0 << endl;
}
void prismCalc()
{
	double baseArea = ReadDouble("Please enter base area of prism: ");
	double basePerim = ReadDouble("Please enter base perimeter of prism: ");
	double height = ReadDouble("Please enter height of prism: ");

	cout << "Volume of prism: "<< baseArea*height << endl;
	cout << "Surface Area of prism: " << (2.0*baseArea) + (basePerim*height) << endl;
}
void cylinderCalc()
{
	double r = ReadDouble("Please enter radius of cylinder: ");
	double h = ReadDouble("Please enter height of cylinder: ");
	cout << "Volume of cylinder: " << M_PI*pow(r,2.0)*h << endl;
	cout << "Surface Area of cylinder: " << M_PI*2.0*r*h + 2.0*M_PI*pow(r,2.0) << endl;
}
void coneCalc()
{
	double r = ReadDouble("Please enter radius of cone: ");
	double h = ReadDouble("Please enter height of cone: ");
	double l = r + sqrt(pow(h,2.0) + pow(r,2.0));
	cout << "Volume of cone: " << (1.0/3.0)*M_PI*pow(r,2.0)*h << endl;
```

```
        cout << "Surface Area of cone: " << M_PI*r*l << endl;
}
```