

# Sample Program 12.2

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## Using Objects

**Problem statement.** Modify Exercise 4.3's `mySavingsPlan1.cpp` by replacing its separate variables with a single object with data fields that replace the variables. Name the new file **`mySavingsPlanWithObjects.cpp`**.

Create an object specification named `struct Savings`, with the data fields for:

1. the amount deposited every month (D in previous versions)
2. interest rate (p in previous versions)
3. number of years to make deposits (years in previous versions)
4. the amount saved (S in previous versions)

Then in your program, declare an *object* of type `Savings`, and use its data fields instead of the four separate variables. Include any additional data fields that you may wish to include beyond these four.

## Solution.

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

#include <cmath>

struct Savings
{
    int years; // years of savings
    int D;     // dollars deposited every month
    double R;  // annual interest rate, percent
    double p;  // monthly interest rate, decimal, calculated
    double T;  // term of savings plan in months, calculated
    double S;  // total saved with interest
};

int main()
{
    // create a savings plan object with initial values
    Savings savings = {10, 100, 7.5}; // set years, D, and R only

    // output (calculated) values
    savings.p = savings.R / 100 / 12;
    savings.T = savings.years * 12;
    savings.S = savings.D * ((pow(1 + savings.p, savings.T) - 1) / savings.p);

    // echoing input values, unformatted
    cout << "In " << savings.years << " years, $";
    cout << savings.D << " deposited per month will grow to $";

    // formatting output (see 4.2)
    cout.setf(ios::fixed|ios::showpoint);
    cout << setprecision(2);
    cout << savings.S << "." << endl;
}
```