

UAH CPE 112

String Expressions

- For now, one string operator, concatenation, "+"
- Consider


```
string bookTitle;
string phrase1;    string phrase2;
phrase1 = "Programming and ";
phrase2 = "Problem Solving";
bookTitle = phrase1 + phrase2;

    bookTitle has "Programming and Problem Solving" stored
bookTitle = phrase2 + phrase1;
    bookTitle now has "Problem SolvingProgramming and " stored
```

Warning: At least one of the operands must be a string variable or named constant.

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Output

- We use `cout` and the insertion operator "<<".


```
cout << "Hello";
```
- `cout` displays the string inserted characters on the standard output device, usually the video screen.


```
cout << "The title is " << bookTitle +
    " , 2nd Edition";
```
- OutputStatement**

```
cout << Expression << Expression ...;
```

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Output Examples

Initializations `ch = '2'` `firstName = "Marie"`
 `lastName = "Curie"`

Statement	What Is Printed (• means blank)
<code>cout << ch;</code>	2
<code>cout << "ch = " << ch;</code>	ch=•2
<code>cout << firstName + " " + lastName;</code>	Marie• Curie
<code>cout << firstName << " " << lastName;</code>	MarieCurie
<code>cout << firstName << " " << lastName;</code>	Marie• Curie
<code>cout << "ERROR MESSAGE";</code>	ERROR•MESSAGE
<code>cout << "Error=" << ch;</code>	Error=2

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Program Construction

<p>Program</p> <pre> [] : FunctionDefinition FunctionDefinition : </pre>	<p>FunctionDefinition</p> <pre> Heading { [] : } </pre>
--	---

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One Function Program Example

```

//*****
// PrintName program
// This program prints a name in two different formats
//*****
#include <iostream>
#include <string>

using namespace std;

const string FIRST = "Herman"; // Person's first name
const string LAST = "Smith"; // Person's last name
const char MIDDLE = 'G'; // Person's middle initial

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
        << endl;

    lastFirst = LAST + " , " + FIRST + " , ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << " ' ' " << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
    << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
    << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
    << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
    << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
    << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
    << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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Program Example (continued)

```

int main()
{
    string firstLast; // Name in first-last format
    string lastFirst; // Name in last-first format

    firstLast = FIRST + " " + LAST;
    cout << "Name in first-last format is " << firstLast
         << endl;

    lastFirst = LAST + ", " + FIRST + ", ";
    cout << "Name in last-first-initial format is ";
    cout << lastFirst << MIDDLE << '.' << endl;

    return 0;
}

```

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More Syntax

Block

```
{
  Statement
  :
}
```

Statement

```
NullStatement
Declaration
Assignment Statement
Output Statement
Block
```

Function

```
Heading
Block
```

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More About Output

Statements

```

cout << "Hi there, ";
cout << "Lois Lane. " << endl;
cout << "Have you seen ";
cout << "Clark Kent?" << endl;

```

Output

```

Hi there,
Lois Lane.
Have you seen
Clark Kent?

```

-

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Still More About Output

Statements

```

cout << "Hi there, " << endl;
cout << "Lois Lane. " << endl;
cout << "Have you seen " << endl;
cout << "Clark Kent?" << endl;

```

Output

```

Hi there,
Lois Lane.
Have you seen
Clark Kent?

```

-

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Another Output Example

Statements

```

cout << "Hi there, " << endl;
cout << "Lois Lane. ";
cout << "Have you seen " << endl;
cout << "Clark Kent?" << endl;

```

Output

```

Hi there,
Lois Lane. Have you seen
Clark Kent?

```

-

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Last Output Example For Now

Statements

```

cout << "Hi there, ";
cout << "Lois Lane. ";
cout << "Have you seen ";
cout << "Clark Kent?" << endl;

```

Output

```

Hi there, Lois Lane. Have you seen
Clark Kent?

```

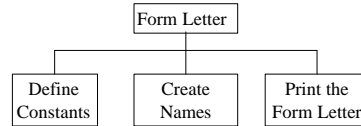
-

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Problem-Solving Case Study

- Problem: You must write a program to write personalized contest entry letters. As a first effort, you need it to work for one name. Later, it will read names from a mailing list file.
- Output: A form letter with a name inserted at the appropriate point so that it appears to be a personal letter.
- Discussion: You need to insert a name in the marketing department's text. The parts of a person's name need to be stored separately, different parts are used in different places. You need to use the string concatenation operator.

Algorithm



Form Letter Program

```

.....
// FormLetter program
// This program prints a form letter for a promotional contest.
// It uses the four parts of a name to build name strings in
// four different formats to be used in personalizing the letter
.....

#include <iostream>
#include <string>

using namespace std;

const string TITLE = "Dr."; // Salutory title
const string FIRST_NAME = "Margaret"; // First name of addressee
const string MIDDLE_INITIAL = "H"; // Middle initial
const string LAST_NAME = "Sklaznick"; // Last name of addressee
  
```

Form Letter (continued)

```

int main()
{
    string first; // Holds the first name plus a blank
    string fullName; // Complete name, including title
    string firstLast; // First name and last name
    string titleLast; // Title followed by the last name

    // Create first name with blank
    first = FIRST_NAME + " ";

    // Create full name
    fullName = TITLE + " " + first + MIDDLE_INITIAL;
    fullName = fullName + ". " + LAST_NAME;

    // Create first and last name
    firstLast = first + LAST_NAME;
  
```

Form Letter (continued)

```

// Create title and last name
titleLast = TITLE + " " + LAST_NAME;

// Print the form letter
cout << fullName << " is a GRAND PRIZE WINNER!!!!" << endl<< endl;
cout << "Dear " << titleLast << ", " << endl << endl;
cout << "Yes it's true! " << firstLast << " has won our" << endl;
cout << "GRAND PRIZE -- your choice of a 42-INCH* COLOR" << endl;
cout << "TV or a FREE WEEKEND IN NEW YORK CITY.**" << endl;
cout << "All that you have to do to collect your prize is" << endl;
cout << "attend one fun-filled all-day presentations" << endl;
cout << "on the joys of owning a timeshare condominium" << endl;
cout << "trailer at the Happy Acres Mobile Campground in" << endl;
cout << "beautiful Panhard, Texas!" << first << "I know" << endl;
cout << "that the 3-hour drive from the nearest airport" << endl;
cout << "to Panhard may seem daunting at first, but isn't" << endl;
  
```

Yet More Form Letter

```

cout << "it worth some extra effort to receive such a" << endl;
cout << "FABULOUS PRIZE? So why wait? Call us right" << endl;
cout << "now to schedule your visit and collect your" << endl;
cout << "GRAND PRIZE!" << endl << endl;
cout << "Most Sincerely," << endl << endl;
cout << "Argyle M. Sneeze" << endl << endl << endl << endl;
cout << "Around the circumference of the packing" << endl;
cout << "crate. ** Includes air fare and hotel." << endl;
cout << "Departure from Nome, AK; surcharge from" << endl;
cout << "other airports. Accommodations within" << endl;
cout << "driving distance of New York at the CheapTel" << endl;
cout << "in Plattsburgh, NY." << endl;
return 0;
}
  
```