Preincrement and Postincrement

Assume that total, num1, and num2 are int variables, with total = 2,

num1 = 3, and num2 = 4. Show the new values of all variables changed

by each of the following:

* total = ++num1; total = 4
* total = num2++; total = 4

* total \*= 5; total = 10
* total += num1 - num2 \* 4; total = -11
* total = ++num1 + num2++; total = 8
* total += 3 \* num1++ - 5; total = 6

Code Trace

Show the output produced by the following segments of code. Assume that all variables are declared as int.

7. i = 30; 8. i = 10;

j = 10; j = 10;

if (i > 10 + j) if (i > 10 + j)

while (i > j) while (i > j)

{ {

i = i - 10; i = i - 10;

cout << i << endl; cout << i << endl;

} }

else else

while (j >= i) while (j >= i)

{ {

j = j - 10; j = j - 10;

cout << j << endl; cout << j << endl;

} }

7. 20 8. 0  
 10

9. i = 30; 10. for (i = 1 ; i <= 10 ; i++)

j = 10; {

while (i >= j) if (i == 2)

{ cout << "hello" << endl;

if (i > j + 10) else if (i == 3)

cout << "yes\n"; cout << "goodbye" << endl;

else else if (i == 4)

cout << "no\n"; cout << "why" << endl;

i = i - 10; if (i < 5)

} cout << "help" << endl;

if (i > 6)

cout << "blue" << endl;

}

9. yes 10. help

no hello

no help

goodbye

help

why

help

blue

blue

blue

blue

11. w = 0; 12. w = 0;

for (h = -2; h <= 5; ++h) for (h = 10; h > 0; --h)

w = w + h; cout << w;

cout << w;

11. 12 12. 0000000000

13. n = 1; 14.for (x = 1; x <= 5; x++)

for (k = 2; k <= 5; k++) cout << x << endl;

{ cout << x << endl;

n = k - 2 \* 3;

cout << k << ' ' << n << endl;

}

13. 2 -4 14. 1

3 -3 2

4 -2 3

5 -1 4

5

6

Code Trace with Loops and Sentinels

15. Given the following program segment:

sum = finished = count = 0;

while (count <= 8 && !finished)

{

cin >> number;

if (number > 0)

sum += number;

else if (number == 0)

finished = 1;

count++;

}

cout << sum << ' ' << count << endl;

What would be the output given this data?

9 -3 4 6 0 5 6 0 5

19 5  
sum: 0 + 9 + 4 + 6 = 19

16. What does the following program segment do? (Your answer should just be a one or two sentence summary of what the code does.)

punctuation = letters = digits = 0;

cout << "enter any character or '/' to quit: ";

cin >> character;

while (character != '/')

{

if (character == ',' || character == '.')

punctuation++;

else if (character >= 'a' && character <= 'z' ||

character >= 'A' && character <= 'Z')

letters++;

else if (character >= '0' && character <= '9')

digits++;

cout << "enter any character or '/' to quit: ";

cin >> character;

}

cout << punctuation << ' ' << letters << ' ' << digits << endl;

If the character input is a punctuation, then 1 is added to punctuation, if it is a letter between A-Z, then 1 is added to letters, and if it is a number, then 1 is added to digits. If it is a backslash, the while loop ends and the program outputs the result.

Programming Exercises

17. Input a character and a number from the user. Print "number" number of lines of output with the character printed once on each line.

char character;

int number;

cout << "Please enter a number and a character, with a space in between them." << endl;

cin >> number >> character;

for (int i = number; i > 0; i--)

{

cout << i << " " << character << endl;

}

18. Write a program segment (including a while loop) that reads one number into a variable named n and reads another number into a variable called maxPower. Then your statements should raise n to each power 0, 1, 2, ..., maxPower, and print a table like the following (suppose n is 2 and maxPower is 4):

n raised

n power to power

--------------------------

2 0 1

2 1 2

2 2 4

2 3 8

2 4 16

#include <iostream>

using namespace std;

int main ()

{

int n, maxPower, i;

int nRaised;

cout << "what number to power" << endl;

cin >> n;

cout << "what is the max power to go to" << endl;

cin >> maxPower;

cout << " n raised" << endl;

cout << " n power to power" << endl;

cout << "-------------------------" << endl;

i = 0;

nRaised = n;

while (i <= maxPower)

{

cout << " " << n << " " << i << " " << nRaised << endl;

nRaised \*= n;

i = i + 1;

}

return 0;

}

19. Redo problem 18 using a “for” loop.

int n, maxPower;

int nRaised;

cout << "what number to power";

cin >> n;

cout << "\nwhat is the max power to go to";

cin >> maxPower;

cout << "\n n raised" << endl;

cout << " n power to power" << endl;

cout << "-------------------------" << endl;

nRaised = n;

for (int i = 0; i <= maxPower; i++)

{

cout << " " << n << " " << i << " " << nRaised << endl;

nRaised \*= n;

}

return 0;

20. Given the following code, change the loop to an event controlled loop that will exit when the user enters a negative number of hours

as the sentinel (Meaning the user will no longer need to enter the number of employees). **Do not use the break or exit command!!!**:

cout << "Enter the number of employees: ";

cin >> numEmployees;

totpay = 0;

empCount = 0;

do

{

cout << "Hours: ";

cin >> hours;

cout << "Rate: $";

cin >> rate;

pay = hours \* rate;

if (pay >= 0)

{

cout << "Employee pay is : $ " << pay << endl;

totpay += pay;

empCount++;

}

else

continue;

}

while (empCount < numEmployees && pay >=0)

cout << "Total payroll is $ " << totpay << endl;

21. Write the statements to read in a group of exam scores ranging in value from 0 to 100. Your program should count and print the number of outstanding scores (90 to 100), satisfactory scores (70 to 89), and the number of unsatisfactory scores (0 to 69). Stop reading exam scores when a negative value is entered.

int score;

int outstanding, satisfactory, unsatisfactory;  
oustanding = 0;  
satisfactory = 0;  
unsatisfactory = 0;

do  
{  
 cout << "Enter exam score: " << endl;

cin >> score;

if (score >= 90) && (score <= 100)  
 {  
 outstanding++;   
 }  
 else if (score >= 70) && (score <= 89)  
 {  
 satisfactory++;  
 }  
 else if (score >= 0) && (score <= 69)  
 {  
 unsatisfactory++;  
 }  
}  
while (score > 0);  
  
cout << "Outstanding scores: " << oustanding << endl;  
cout << "Satisfactory scores: " << satisfactory << endl;  
cout << "Unsatisfactory scores: " << unsatisfactory << endl;

return 0;

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