

# Programming Fundamentals

Lecture # 35

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# Problem 1

- Write a program that asks the user to enter integers as inputs to be stored in the variables 'a' and 'b' respectively. There are also two integer pointers named ptrA and ptrB. Assign the values of 'a' and 'b' to ptrA and ptrB respectively, and display them

## Problem 2

- Write a C++ program to input numeric data into an array of size 10. The program prints on screen a pointer that points to the maximum value.

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# Problem 3

- For each of the following, write C++ statements that perform the specified task. Assume that double-precision, floating-point numbers are stored in eight bytes and that starting address of array is at location 1002500 in memory. Each part of the exercise should use the result of previous parts where appropriate
  - a) Declare an array of type double called numbers with 10 elements, and initialize the elements to the values 0.0, 1.1, 2.2, ..., 9.9. Assume that symbolic constant SIZE has been defined as 10.
  - b) Declare a pointer nPtr that points to a variable of type double
  - c) Use a for statement to print the elements of array numbers using array subscript notation. Print each number with one position of precision of the decimal point

## Problem 3 (Continue...)

- d) Write two separate statements that each assign the starting address of array numbers to the pointer variable nPtr
- e) Use a for statement to print the elements of array numbers using pointer/offset notation with pointer nPtr
- f) Use a for statement to print the elements of array numbers using pointer/offset notation with the array name as the pointer
- g) Use a for statement to print the elements of array numbers using pointer/subscript notation with pointer nPtr

## Problem 3 (Continue...)

- h) Refer to the fourth element of array numbers using array subscript notation, pointer/offset notation with the array name as the pointer, pointer subscript notation with nPtr and pointer/offset notation with nPtr
- i) Assuming that nPtr points to the beginning of array numbers, what address is referenced by  $\text{nPtr} + 8$ ? What value is stored at that location?
- j) Assuming that nPtr points to numbers[5], what address is referenced by nPtr after  $\text{nPtr} -= 4$  is executed? What's the value stored at that location?

## Problem 4

- For each of the following, write a single statement that performs the specified task. Assume that floating-point variables `number1` and `number2` have been declared and that `number1` has been initialized to 7.3.
  - a) Declare the variable `fPtr` to be a pointer to an object of type `double`.
  - b) Assign the address of variable `number1` to pointer variable `fPtr`
  - c) Print the value of the object pointed to by `fPtr`
  - d) Assign the value of the object pointed to by `fPtr` to variable `number2`
  - e) Print the value of `number2`
  - f) Print the address of `number1`
  - g) Print the address stored in `fPtr`. Is the value printed the same as the address of `number1`?



# Problem 5

- For each of the following, write C++ statements that perform the specified task. Assume that unsigned integers are stored in two bytes and that the starting address of the array is at location 1002500 in memory
  - a) Declare an array of type unsigned int called values with five elements, and initialize the elements to the even integers from 2 to 10. Assume that the symbolic constant SIZE has been defined as 5
  - b) Declare a pointer vPtr that points to an object of type unsigned int
  - c) Use a for statement to print the elements of array values using array subscript notation



## Problem 5 (Continue...)

- d) Write two separate statements that assign the starting address of array values to pointer variable vPtr
- e) Use a for statement to print the elements of array values using pointer/offset notation
- f) Use a for statement to print the elements of array values using pointer/offset notation with the array name as the pointer
- g) Use a for statement to print the elements of array values by subscripting the pointer to the array

## Problem 5 (Continue...)

- h) Refer to the fifth element of values using array subscript notation, pointer/offset notation with the array name as the pointer, pointer subscript notation and pointer/offset notation
- i) What address is referenced by  $vPtr + 3$ ? What value is stored at that location?
- j) Assuming that  $vPtr$  points to `values[ 4 ]`, what address is referenced by  $vPtr -= 4$ ? What value is stored at that location?

# Problem 6

- For each of the following, write a single statement that performs the specified task. Assume that long variables value1 and value2 have been declared and value1 has been initialized to 200000.
  - a) Declare the variable longPtr to be a pointer to an object of type long
  - b) Assign the address of variable value1 to pointer variable longPtr
  - c) Print the value of the object pointed to by longPtr
  - d) Assign the value of the object pointed to by longPtr to variable value2
  - e) Print the value of value2
  - f) Print the address of value1
  - g) Print the address stored in longPtr. Is the value printed the same as value1's address?

# Problem 7

Given the declaration:

```
int x;  
int *p;  
int *q;
```

mark the following statements as valid or invalid. If a statement is invalid, explain why.

- a.  $p = q;$
- b.  $*p = 56;$
- c.  $p = x;$
- d.  $*p = *q;$
- e.  $q = \&x;$
- f.  $*p = q;$

## Problem 8

What is the output of the following C++ code?

```
int x;  
int y;  
int *p = &x;  
int *q = &y;  
*p = 35;  
*q = 98;  
*p = *q;  
cout << x << " " << y << endl;  
cout << *p << " " << *q << endl;
```

## Problem 9

What is the output of the following C++ code?

```
int x;  
int y;  
int *p = &x;  
int *q = &y;  
x = 35;  
y = 46;  
p = q;  
*p = 78;  
cout << x << " " << y << endl;  
cout << *p << " " << *q << endl;
```

# Problem 10

Given the declaration:

```
int num = 6;  
int *p = &num;
```

which of the following statements increment(s) the value of num?

- a. `p++;`
- b. `(*p)++;`
- c. `num++;`
- d. `(*num)++;`