**Department of Electrical and Computer Engineering, NSU**

**CSE 115L: Fundamentals of Computer Programming (Section 4)**

**Lab 12 (Pointers), Faculty: Rsl**

**Pointers**: C Pointer is a variable that stores/points the address of another variable. C Pointer is used to allocate memory dynamically i.e. at run time. The pointer variable might be belonging to any of the data type such as int, float, char, double, short etc.

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| **Basic Syntax** | **Concept of Pointer** |
| dataType \*varName;  Example: int \*p; | int a = 10 ;  Whenever a variable is declared, system will allocate a location to that variable in the memory, to hold value. This location will have its own address number.    We can access the value 10 by either using the variable name **a** or the address 80F. Since the memory addresses are simply numbers they can be assigned to some other variable. The variable that holds memory address are called **pointer variables**. A **pointer** variable is therefore nothing but a variable that contains an address, which is a location of another variable. Value of **pointer variable** will be stored in another memory location.    Code:  int \*ptr= &a; |

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| **Example 1: reference operator( &)** | **Example 2: manipulating address and values with pointer** |
| #include <stdio.h>  int main(){  int var=5;  printf("Value: %d\n",var);  printf("Address: %d",&var);  return 0;  } | #include <stdio.h>  int main(){  int c;  int\* pc;  c=22;  printf("Address of c:%d\n",&c);  printf("Value of c:%d\n\n",c);  pc=&c;  printf("Address of pointer pc:%d\n",pc);  printf("Content of pointer pc:%d\n\n",\*pc);  c=11;  printf("Address of pointer pc:%d\n",pc);  printf("Content of pointer pc:%d\n\n",\*pc);  \*pc=2;  printf("Address of c:%d\n",&c);  printf("Value of c:%d\n\n",c);  return 0;  } |

**Example 2 pictorial representation:**

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| **Example 3: pointer to pointer** | **Example 4: Swapping two numbers** |
| #include <stdio.h>  int main () {  int var;  int \*ptr;  int \*\*pptr;  var = 3000;  ptr = &var;  pptr = &ptr;  printf("Value of var = %d\n", var );  printf("Value available at \*ptr = %d\n", \*ptr );  printf("Value available at \*\*pptr = %d\n", \*\*pptr);  return 0;  } | #include<stdio.h>  void swap(int \*p, int \*q);  int main()  {  int a=2,b=3;  swap(&a,&b);  printf("a= %d and b= %d",a,b);  return 0;  }  void swap(int \*p, int \*q)  {  int temp= \*p;  \*p=\*q;  \*q=temp;  } |