



Advanced Programming in C++

فرشاد حکیم پور

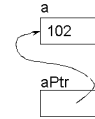
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Pointers

- A pointer is a type of variable that refers to a value.
- It is a kind of indirect addressing

```
int a = 102;
```

```
int *aPtr = &a;
```



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Pointer Variable Definition in C++

- Pointers are types just as other variables
- '*' prefix is used to indicate a pointer variable

```
int *intPtr;  
double *doublePtr;
```

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Address Operator in C++

- Address of a variable in memory is obtained by '&' operator
- '*' is used to indicate a pointer variable

```
int i;  
int *intPtr = &i;  
double x;  
double *doublePtr = &x;
```

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Examples

```
int i = 5;  
int *iPtr = &i;  
cout << i << endl;      // 5  
cout << &i << endl;     // 43b69f73  
cout << iPtr << endl;    // 43b69f73
```

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Dereferencing operator in C++

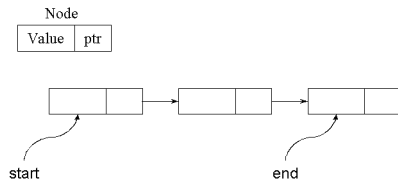
- How to obtain the value in the location a pointer is referring to?
- '*' operator is used for indirect access to the value
- It is also called dereferencing operator or indirection operator

```
int i = 5;  
int *iPtr = &i;  
cout << *iPtr << endl;    // 5
```

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Linked List Structure

- It is a list that can only be accessed sequentially



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Node

- It is a list that can only be accessed sequentially

```
class Node
{
private:
    char val;
    Node *ptr;
public:
    Node(char);
    Node *getNext();
    void setNext(Node);
    char getValue();
    void setValue(char);
};
```

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Parameter Passing

- Call-by-value

```
int function inc(int i) { i++; return i;}
. . .
j = inc(i);
```

- Call-by-reference

```
int function inc(int *i) { *i++; return *i;}
. . .
j = inc(i);
```

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Exercise

- Implement the queue by a linked list
- Implement the Bubble Sort algorithm for an array of k integer numbers
- Implement Bubble Sort for a linked list
 - Send the c++ file to tamrin.ut@gmail.com
 - Add EX2 - <Your Stud. No.> to the subject line
 - Deadline: 13th - Azar

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