Princeton University
COS 217: Introduction to Programming Systems
Pointer-Related Operators

Key

x A variable of any type
p, p1, p2 Pointer variables
i An integral expression

Operators Meaningful for Any Pointer Variable

"Address Of" Operator

&x The address of x.

Dereference Operator

*p The contents of the memory referenced by p.

Relational Operators

p1 == p2 1 if p1 is equal to p2, and 0 otherwise.
p1 != p2 1 if p1 is unequal to p2, and 0 otherwise.

Assignment Operator

Operators Meaningful if and only if Pointers Reference Array Elements

Array Subscripting Operator

\[ p[i] \] *(p + i), that is, the contents of memory at the address that is \( i \) elements after the address referenced by \( p \).

Arithmetic Operators

\[ p + i \] The address of the \( i \)th element after the one referenced by \( p \).
\[ i + p \] The address of the \( i \)th element after the one referenced by \( p \).
\[ p - i \] The address of the \( i \)th element before the one referenced by \( p \).
\[ p++ \] Side effect: Increment \( p \) to point to the next element.
\[ ++p \] Side effect: Increment \( p \) to point to the next element.
\[ p-- \] Side effect: Decrement \( p \) to point to the previous element.
\[ --p \] Side effect: Decrement \( p \) to point to the previous element.

Arithmetic Operators

\[ p1 - p2 \] The "span" of \( p1 \) and \( p2 \).

Relational Operators

\[ p1 < p2 \] 1 if \( p1 \) is less than \( p2 \), and 0 otherwise.
\[ p1 <= p2 \] 1 if \( p1 \) is less than or equal to \( p2 \), and 0 otherwise.
\[ p1 > p2 \] 1 if \( p1 \) is greater than \( p2 \), and 0 otherwise.
\[ p1 >= p2 \] 1 if \( p1 \) is greater than or equal to \( p2 \), and 0 otherwise.

Assignment Operators

\[ p += i \] Side effect: Increment \( p \) so its value is the address of the \( i \)th element after the one referenced by \( p \).
\[ p -= i \] Side effect: Decrement \( p \) so its value is the address of the \( i \)th element before the one referenced by \( p \).

Disallowed

\[ p1 + p2 \]
\[ i - p \]
\[ i += p \]
\[ i -= p \]
\[ p == i \]