

Princeton University

COS 217: Introduction to Programming Systems

The "const" Keyword with Pointers

Pointer to Constant

```
const int iFirst = 100;
const int iSecond = 200;
const int *piThird = &iFirst; /* piThird is a "pointer to a constant." */
iFirst = 300; /* Error. Cannot change iFirst. */
iSecond = 400; /* Error. Cannot change iSecond. */
piThird = &iSecond; /* OK. */
*piThird = 500; /* Error. Cannot change *piThird. */
```

Constant Pointer

```
int iFirst = 100;
int iSecond = 200;
int *const piThird = &iFirst; /* piThird is a "constant pointer." */
iFirst = 300; /* OK. */
iSecond = 400; /* OK. */
piThird = &iSecond; /* Error. Cannot change piThird. */
*piThird = 500; /* OK. */
```

Constant Pointer to Constant

```
const int iFirst = 100;
const int iSecond = 200;
const int *const piThird = &iFirst; /* piThird is a "constant pointer to a constant." */
iFirst = 300; /* Error. Cannot change iFirst. */
iSecond = 400; /* Error. Cannot change iSecond. */
piThird = &iSecond; /* Error. Cannot change piThird. */
*piThird = 500; /* Error. Cannot change *piThird. */
```

Disallowed Mismatch

```
const int iFirst = 100;
const int iSecond = 200;
int *piThird = &iFirst;          /* Error. Subversive. Subsequently changing *piThird */
                                 /* would change iFirst. */
```

Disallowed Mismatch in Function Calls

```
void f(int *piThird)
{
    ...
}
...
const int iFirst = 5;
const int *piSecond = &iFirst;
f(piSecond);                    /* Error. Subversive. If f changes *piThird, then
                                 *piSecond also would change. */
```

Allowed Mismatch

```
int iFirst = 100;
int iSecond = 200;
const int *piThird = &iFirst;   /* OK, even though subsequently changing iFirst would
                                 change *piThird. */
iFirst = 300;                  /* OK. Also changes *piThird. */
iSecond = 400;                 /* OK. */
piThird = &iSecond;           /* OK, even though subsequently changing iSecond would
                                 change *piThird. */
*piThird = 500;                /* Error. Cannot change *piThird. */
```

Allowed Mismatch in Function Calls

```
void f(const int *piThird)
{
    ...
}
...
int iFirst = 5;
int *piSecond = &iFirst;
f(piSecond);                   /* OK. *piSecond is protected against accidental change
                                 by f. */
```