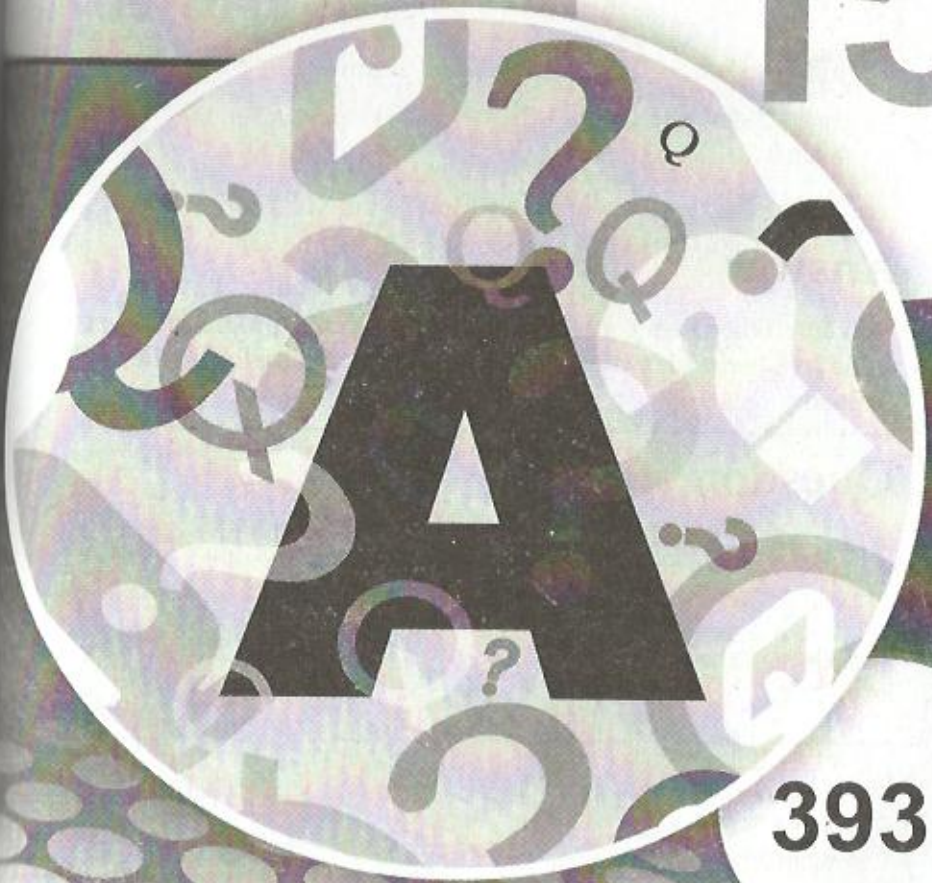
The const Phenomenon

15



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Question 15.1

Point out the error in the following program.

```
#inciude <stdio.h>
int main( )
{
    const int x ;
    x = 128 ;
    printf ( "%d\n", x ) ;
    return 0 ;
}
```

Answer

Nowhere other than through initialization can a program assign a value to a *const* identifier. *x* should have been initialized when it is defined.

Question 15.2

Which of the following is the correct output for the program given below?

```
#include <stdio.h>
int main( )
{
    int y = 128 ;
    const int x = y ;
    printf ( "%d\n", x ) ;
    return 0 ;
}
```

A. 128
B. Garbage value
C. Error

D. 0

Answer

A

Question 15.3

Which of the following is the correct output for the program given below?

```
#include <stdio.h>
int main( )
{
    const int i = 10 ;
    printf ( "%d\n", i++ ) ;
    return 0 ;
}
```

A. 10
B. 11
C. No output
D. Error: ++ needs a lvalue

Answer

D

Question 15.4

Which of the following is the correct output for the program given below?

```
#include <stdio.h>
int main( )
{
```

```
    const int c = -11 ;
    const int d = 34 ;
    printf ( "%d %d\n", c, d ) ;
    return 0 ;
}
```

A. Error
B. –11 34
C. 11 34
D. none of these

Answer

B

Question *15.5*

Which of the following is the correct output for the program given below?

```
#include <stdio.h>
int main( )
{
    const char *s = "" ;
    char str[ ] = "Hello" ;
    s = str ;
    while ( *s )
        printf ( "%c", *s++ ) ;
    printf ( "\n" ) ;
    return 0 ;
}
```

A. Error
B. H
C. Hello
D. Hel

Answer

C

Question *15.6*

Which of the following is the correct output for the program given below?

```
#include <stdio.h>
int get( ) ;
int main( )
{
    const int x = get( ) ;
    printf ( "%d\n", x ) ;
    return 0 ;
}
int get( )
{
    return ( 20 ) ;
}
```

A. 20
B. Garbage value
C. Error
D. 0

Answer

A

Question *15.7*

Point out the error, if any, in the following program.

```
#include <stdio.h>
```

```
#define MAX 128
int main( )
{
    const int max = 128 ;
    char array[max] ;
    char string[MAX] ;
    array[0] = string[0] = 'A' ;
    printf ( "%c %c\n", array[0], string[0] ) ;
    return 0 ;
}
```

Answer

No error. It will output A A.

Question *15.8*

What will be the output of the following program?

```
#include <stdio.h>
int fun ( int *f )
{
    *f = 10 ;
    return 0 ;
}
int main( )
{
    const int arr[5] = { 1, 2, 3, 4, 5 } ;
    printf ( "before modification arr[3] = %d\n", arr[3] ) ;
    fun ( &arr[3] ) ;
    printf ( "After modification arr[3] = %d\n", arr[3] ) ;
    return 0 ;
}
```


Answer

Error: Cannot convert parameter 1 from 'const int *' to 'int *'. In the function *fun( )* we are trying to modify element of a constant array.

Question *15.9*

Point out the error, if any, in the following program.

```
#include <stdio.h>
int main( )
{
    char mybuf[ ] = "Zanzibar" ;
    char yourbuf[ ] = "Zienckewiz" ;
    char * const ptr = mybuf ;
    *ptr = 'a' ;
    ptr = yourbuf ;
    return 0 ;
}
```

Answer

ptr pointer is constant. In ptr = yourbuf the program is trying to modify it, hence an error.

Question *15.10*

Point out the error, if any, in the following program.

```
#include <stdio.h>
int main( )
{
    char mybuf[ ] = "Zanzibar" ;
    char yourbuf[ ] = "Zienckewiz" ;
    const char *ptr = mybuf ;
    *ptr = 'a' ;
```

```
    ptr = yourbuf ;
    return 0 ;
}
```

Answer

ptr can be modified but not the object that it is pointing to. Hence **ptr = 'a'* gives an error.

Question *15.11*

Point out the error, if any, in the following program.

```
#include <stdio.h>
int main( )
{
    char mybuf[ ] = "Zanzibar" ;
    const char * const ptr = "Hello" ;
    ptr = mybuf ;
    *ptr = 'M' ;
    return 0 ;
}
```

Answer

ptr is a constant pointer to a constant object. We can neither modify *ptr* nor the object it is pointing to.

Question *15.12*

Which of the following statements are correct about the following program?

```
#include <stdio.h>
int main( )
{
```



```
    int i = 10, j = 20 ;
    int * const ptr = &i ;
    ptr = &j ;
    return 0 ;
}
```

A. ptr should at all times contain address of *i*
B. ptr can be assigned address of *j*
C. Error: cannot modify *ptr*
D. *const* cannot be used with pointers

Answer

A, C

Question *15.13*

What will be the output of the following program?

```
#include <stdio.h>
int main( )
{
    int i = 10, j = 20 ;
    const int *ptr = &i ;
    printf ( "Address of i = %u\n", ptr ) ;
    printf ( "Value at ptr = %d\n", *ptr ) ;
    ptr = &j ;
    printf ( "Address of j = %u\n", ptr ) ;
    printf ( "Value at ptr = %d\n", *ptr ) ;
    return 0 ;
}
```

Answer

Address of i = 3014364
Value at ptr = 10

```
Address of j = 3014352
Value at ptr = 20
```

Question 15.14

What does the following prototype indicate?

```
void strcpy ( char *target, const char *source )
```

Answer

We can modify the pointers *source* as well as *target*. However, the object to which *source* is pointing cannot be modified.

Question 15.15

What does the following prototype indicate?

```
const char *change ( char *, int )
```

Answer

The function *change( )* receives a *char* pointer and an *int* and returns a pointer to a constant *char*.

Question 15.16

Point out the error, if any, in the following program.

```
#include <stdio.h>
const char *fun( ) ;
int main( )
{
    char *ptr = fun( ) ;
    return 0 ;
}
const char *fun( )
{
    return "Hello" ;
}
```


Answer

Error: cannot convert from 'const char *' to 'char *'. This occurs because caller *fun( )* returns a pointer to a *const* character which is being assigned to a pointer to a non-const.

Question 15.17

Point out the error in the following program.

```
#include <stdio.h>
const char *fun( ) ;
int main( )
{
    *fun( ) = 'A' ;
    return 0 ;
}
const char *fun( )
{
    return "Hello" ;
}
```

Answer

Error: *fun( )* returns a pointer to a *const* character which cannot be modified.

Question 15.18

What do you mean by *const* correctness?

Answer

A program is 'const correct' if it never changes (a more common term is mutates) a constant object.

Question *15.19*

Which of the following is the correct output for the program given below?

```
#include <stdio.h>
int main( )
{
    const int x = 5 ;
    const int *ptrx ;
    ptrx = &x ;
    *ptrx = 10 ;
    printf ( "%d\n", x ) ;
    return 0 ;
}
```

A. 5
B. 10
C. Error
D. Garbage value

Answer

C

Question *15.20*

Point out the error, if any, in the following program.

```
#include <stdio.h>
int main( )
{
    const int k = 7 ;
    int * const q = &k ;
    printf ( "%d\n", *q ) ;
    return 0 ;
}
```


Answer

Error: Cannot convert from 'const int *' to 'int *const '.

Question *15.21*

What is the difference in the following declarations?

```
const char *s ;
char const *s ;
```

Answer

There is no difference.

Question *15.22*

What is the difference in the following declarations?

```
const char * const s ;
char const * const s ;
```

Answer

There is no difference.

Question *15.23*

Is the following a properly written function? If not, why?

```
int fun ( const int n )
{
    int a ;
    a = n * n ;
    return a ;
}
```

Answer

Since *fun( )* will be called by value there is no need to declare *n* as a *const* since passing by value already prevents *fun( )* from modifying *n*.

Question *15.24*

What will be the output of the following program?

```
#include <stdio.h>
#include <string.h>
union employee
{
    char name[15] ;
    int age ;
    float salary ;
} ;
const union employee e1 ;
int main( )
{
    strcpy ( e1.name, "K" ) ;
    printf ( "%s %d %f\n", e1.name, e1.age, e1.salary ) ;
    return 0 ;
}
```


Answer

Error: 'strcpy' : Cannot convert parameter 1 from 'const char [15]' to 'char *'.

Question *15.25*

Point out the error, if any, in the following program.

```
#include <stdio.h>
#include <string.h>
union employee
{
    char name[15] ;
    int age ;
    float salary ;
} ;
const union employee e1 ;
int main( )
{
    strcpy ( e1.name,"K" ) ;
    printf ( "%s", e1.name ) ;
    e1.age = 85 ;
    printf ( "%d", e1.age ) ;
    printf ( "%f\n", e1.salary ) ;
    return 0 ;
}
```

Answer

Error: Cannot modify const object.

Question *15.26*

Point out the error, if any, in the following program.

```
#include <stdio.h>
#include <string.h>
int fun ( const union employee *e ) ;
union employee
{
    char name[15] ;
    int age ;
    float salary ;
} ;
const union employee e1 ;
int main( )
{
    strcpy ( e1.name, "A" ) ;
    fun ( &e1 ) ;
    printf ( "%s %d %f\n", e1.name, e1.age, e1.salary ) ;
    return 0 ;
}
int fun ( const union employee *e )
{
    strcpy ( ( *e ).name, "B" ) ;
    return 0 ;
}
```

Answer

Error: Cannot convert parameter 1 from 'const char [15]' to 'char *'.