
```
1 // Prints an integer
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     int n = 50;
8     printf("%i\n", n);
9 }
```

```
1 // Prints an integer's address
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     int n = 50;
8     printf("%p\n", &n);
9 }
```

```
1 // Stores and prints an integer's address
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     int n = 50;
8     int *p = &n;
9     printf("%p\n", p);
10 }
```

```
1 // Stores and prints an integer via its address
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     int n = 50;
8     int *p = &n;
9     printf("%i\n", *p);
10 }
```

```
1 // Prints a string
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     string s = "HI!";
9     printf("%s\n", s);
10 }
```

```
1 // Prints a string's address as well the addresses of its chars
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     string s = "HI!";
9     printf("%p\n", s);
10    printf("%p\n", &s[0]);
11    printf("%p\n", &s[1]);
12    printf("%p\n", &s[2]);
13    printf("%p\n", &s[3]);
14 }
```

```
1 // Declares a string with CS50 Library
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     string s = "HI!";
9     printf("%s\n", s);
10 }
```

```
1 // Declares a string without CS50 Library
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     char *s = "HI!";
8     printf("%s\n", s);
9 }
```

```
1 // Prints a string's chars
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     char *s = "HI!";
8     printf("%c\n", s[0]);
9     printf("%c\n", s[1]);
10    printf("%c\n", s[2]);
11 }
```

```
1 // Prints a string's chars via pointer arithmetic
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     char *s = "HI!";
8     printf("%c\n", *s);
9     printf("%c\n", *(s + 1));
10    printf("%c\n", *(s + 2));
11 }
```

```
1 // Prints substrings via pointer arithmetic
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     char *s = "HI!";
8     printf("%s\n", s);
9     printf("%s\n", s + 1);
10    printf("%s\n", s + 2);
11 }
```

```
1 // Compares two integers
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     // Get two integers
9     int i = get_int("i: ");
10    int j = get_int("j: ");
11
12    // Compare integers
13    if (i == j)
14    {
15        printf("Same\n");
16    }
17    else
18    {
19        printf("Different\n");
20    }
21 }
```

```
1 // Compares two strings' addresses
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     // Get two strings
9     char *s = get_string("s: ");
10    char *t = get_string("t: ");
11
12    // Compare strings' addresses
13    if (s == t)
14    {
15        printf("Same\n");
16    }
17    else
18    {
19        printf("Different\n");
20    }
21 }
```

```
1 // Compares two strings using strcmp
2
3 #include <cs50.h>
4 #include <stdio.h>
5 #include <string.h>
6
7 int main(void)
8 {
9     // Get two strings
10    char *s = get_string("s: ");
11    char *t = get_string("t: ");
12
13    // Compare strings
14    if (strcmp(s, t) == 0)
15    {
16        printf("Same\n");
17    }
18    else
19    {
20        printf("Different\n");
21    }
22 }
```

```
1 // Prints two strings
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     // Get two strings
9     char *s = get_string("s: ");
10    char *t = get_string("t: ");
11
12    // Print strings
13    printf("%s\n", s);
14    printf("%s\n", t);
15 }
```

```
1 // Prints two strings' addresses
2
3 #include <cs50.h>
4 #include <stdio.h>
5
6 int main(void)
7 {
8     // Get two strings
9     char *s = get_string("s: ");
10    char *t = get_string("t: ");
11
12    // Print strings' addresses
13    printf("%p\n", s);
14    printf("%p\n", t);
15 }
```



```
1 // Capitalizes a string
2
3 #include <cs50.h>
4 #include <ctype.h>
5 #include <stdio.h>
6 #include <string.h>
7
8 int main(void)
9 {
10     // Get a string
11     string s = get_string("s: ");
12
13     // Copy string's address
14     string t = s;
15
16     // Capitalize first letter in string
17     t[0] = toupper(t[0]);
18
19     // Print string twice
20     printf("s: %s\n", s);
21     printf("t: %s\n", t);
22 }
```

```
1 // Capitalizes a string, checking length first
2
3 #include <cs50.h>
4 #include <ctype.h>
5 #include <stdio.h>
6 #include <string.h>
7
8 int main(void)
9 {
10     // Get a string
11     string s = get_string("s: ");
12
13     // Copy string's address
14     string t = s;
15
16     // Capitalize first letter in string
17     if (strlen(t) > 0)
18     {
19         t[0] = toupper(t[0]);
20     }
21
22     // Print string twice
23     printf("s: %s\n", s);
24     printf("t: %s\n", t);
25 }
```

```
1 // Capitalizes a copy of a string
2
3 #include <cs50.h>
4 #include <ctype.h>
5 #include <stdio.h>
6 #include <stdlib.h>
7 #include <string.h>
8
9 int main(void)
10 {
11     // Get a string
12     char *s = get_string("s: ");
13
14     // Allocate memory for another string
15     char *t = malloc(strlen(s) + 1);
16
17     // Copy string into memory, including '\0'
18     for (int i = 0; i <= strlen(s); i++)
19     {
20         t[i] = s[i];
21     }
22
23     // Capitalize copy
24     t[0] = toupper(t[0]);
25
26     // Print strings
27     printf("s: %s\n", s);
28     printf("t: %s\n", t);
29 }
```

```
1 // Capitalizes a copy of a string, defining n in loop too
2
3 #include <cs50.h>
4 #include <ctype.h>
5 #include <stdio.h>
6 #include <stdlib.h>
7 #include <string.h>
8
9 int main(void)
10 {
11     // Get a string
12     char *s = get_string("s: ");
13
14     // Allocate memory for another string
15     char *t = malloc(strlen(s) + 1);
16
17     // Copy string into memory, including '\0'
18     for (int i = 0, n = strlen(s); i <= n; i++)
19     {
20         t[i] = s[i];
21     }
22
23     // Capitalize copy
24     t[0] = toupper(t[0]);
25
26     // Print strings
27     printf("s: %s\n", s);
28     printf("t: %s\n", t);
29 }
```

```
1 // Capitalizes a copy of a string using strcpy
2
3 #include <cs50.h>
4 #include <ctype.h>
5 #include <stdio.h>
6 #include <stdlib.h>
7 #include <string.h>
8
9 int main(void)
10 {
11     // Get a string
12     char *s = get_string("s: ");
13
14     // Allocate memory for another string
15     char *t = malloc(strlen(s) + 1);
16
17     // Copy string into memory
18     strcpy(t, s);
19
20     // Capitalize copy
21     t[0] = toupper(t[0]);
22
23     // Print strings
24     printf("s: %s\n", s);
25     printf("t: %s\n", t);
26 }
```

```
1 // Capitalizes a copy of a string without memory errors
2
3 #include <cs50.h>
4 #include <ctype.h>
5 #include <stdio.h>
6 #include <stdlib.h>
7 #include <string.h>
8
9 int main(void)
10 {
11     // Get a string
12     char *s = get_string("s: ");
13     if (s == NULL)
14     {
15         return 1;
16     }
17
18     // Allocate memory for another string
19     char *t = malloc(strlen(s) + 1);
20     if (t == NULL)
21     {
22         return 1;
23     }
24
25     // Copy string into memory
26     strcpy(t, s);
27
28     // Capitalize copy
29     if (strlen(t) > 0)
30     {
31         t[0] = toupper(t[0]);
32     }
33
34     // Print strings
35     printf("s: %s\n", s);
36     printf("t: %s\n", t);
37
38     // Free memory
39     free(t);
40     return 0;
41 }
```

```
1 // Demonstrates memory errors via valgrind
2
3 #include <stdio.h>
4 #include <stdlib.h>
5
6 int main(void)
7 {
8     int *x = malloc(3 * sizeof(int));
9     x[1] = 72;
10    x[2] = 73;
11    x[3] = 33;
12 }
```

```
1 #include <stdio.h>
2 #include <stdlib.h>
3
4 int main(void)
5 {
6     int scores[1024];
7     for (int i = 0; i < 1024; i++)
8     {
9         printf("%i\n", scores[i]);
10    }
11 }
```



```
1 // Fails to swap two integers
2
3 #include <stdio.h>
4
5 void swap(int a, int b);
6
7 int main(void)
8 {
9     int x = 1;
10    int y = 2;
11
12    printf("x is %i, y is %i\n", x, y);
13    swap(x, y);
14    printf("x is %i, y is %i\n", x, y);
15 }
16
17 void swap(int a, int b)
18 {
19     int tmp = a;
20     a = b;
21     b = tmp;
22 }
```

```
1 // Swaps two integers using pointers
2
3 #include <stdio.h>
4
5 void swap(int *a, int *b);
6
7 int main(void)
8 {
9     int x = 1;
10    int y = 2;
11
12    printf("x is %i, y is %i\n", x, y);
13    swap(&x, &y);
14    printf("x is %i, y is %i\n", x, y);
15 }
16
17 void swap(int *a, int *b)
18 {
19     int tmp = *a;
20     *a = *b;
21     *b = tmp;
22 }
```

```
1 // Gets an int from user using scanf
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     int x;
8     printf("x: ");
9     scanf("%i", &x);
10    printf("x: %i\n", x);
11 }
```

```
1 // Incorrectly gets a string from user using scanf
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     char *s;
8     printf("s: ");
9     scanf("%s", s);
10    printf("s: %s\n", s);
11 }
```

```
1 // Dangerously gets a string from user using scanf
2
3 #include <stdio.h>
4
5 int main(void)
6 {
7     char s[4];
8     printf("s: ");
9     scanf("%s", s);
10    printf("s: %s\n", s);
11 }
```

1 name,number