# GE3 COMPUTER SCIENCE

## C AND C ++ LECTURE SERIES *FOR*

## B.SC 3RD SEMESTER *BY*

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**LECTURE 4**

# INPUT AND OUTPUT OF DATA

## The input /output function

- An input /output function can be accessed from anywhere within a program simply by writing the function name, followed by a list of arguments enclosed in parentheses.
- scanf(), getchar(), printf(), putchar() …

# INPUT AND OUTPUT OF DATA

**Example**

```
main()
{
        char c,d;                           /* declarations */
        float x,y;
        int i,j,k;

        c = getchar();                      /* character input */
        scanf("%f", &x);                    /* floating-point input */
        scanf("%d %d", &i, &j);             /* integer input */
        . . .                               /* action statements */
        putchar(d);                         /* character output */
        printf("%3d %7.4f", k, y);          /* numerical output */
}
```

# INPUT AND OUTPUT OF DATA

## THE getchar() FUNCTION

```
character variable = getchar();
```

```
char c;
. . . . .
c = getchar();
```

# INPUT AND OUTPUT OF DATA

## THE putchar() FUNCTION

```
putchar(character variable)
```

```
char c;
. . . . .
putchar(c);
```

# INPUT AND OUTPUT OF DATA

## THE scanf() FUNCTION

```
scanf(control string, arg1, arg2, . . . , argn)
```

```
#include <stdio.h>

main()

{
    char item[20];
    int partno;
    float cost;

    . . . . .

    scanf("%s %d %f", item, &partno, &cost);

    . . . . .
}
```

# INPUT AND OUTPUT OF DATA

## THE scanf() FUNCTION (cont.)

| *Conversion Character* | *Meaning* |
|---|---|
| c | data item is a single character |
| d | data item is a decimal integer |
| e | data item is a floating-point value |
| f | data item is a floating-point value |
| g | data item is a floating-point value |
| h | data item is a short integer |
| i | data item is a decimal, hexadecimal or octal integer |
| o | data item is an octal integer |
| s | data item is a string followed by a whitespace character (the null character \0 will automatically be added at the end) |
| u | data item is an unsigned decimal integer |
| x | data item is a hexadecimal integer |
| [ . . . ] | data item is a string which may include whitespace characters (see explanation below) |

# INPUT AND OUTPUT OF DATA

## THE scanf() FUNCTION (cont.)

```
#include <stdio.h>

main()

{
    char item[20];
    int partno;
    float cost;

    . . . . .

    scanf("%s %d %f", item, &partno, &cost);

    . . . . .
}
```

```
fastener 12345 0.05
```

# INPUT AND OUTPUT OF DATA

## THE scanf() FUNCTION (cont.)

```
#include <stdio.h>

main()
{
    int a, b, c;

    . . . . .

    scanf("%3d %3d %3d", &a, &b, &c);

    . . . . .
}
```

If the data had been entered as

```
123 456 789
```

Then the assignments would be

```
a = 123,        b = 456,    c = 789
```

Now suppose that the data had been entered as

```
123456789
```

Then the assignments would be

```
a = 123,        b = 456,    c = 789
```

# INPUT AND OUTPUT OF DATA

## THE printf() FUNCTION

```
printf(control string, arg1, arg2, . . . , argn)
```

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

main()   /* print several floating-point numbers */
{
    float i = 2.0, j = 3.0;
    printf("%f %f %f %f", i, j, i+j, sqrt(i+j));
}
```

```
2.000000 3.000000 5.000000 2.236068
```

# INPUT AND OUTPUT OF DATA

## THE printf() FUNCTION (cont.)

```
#include <stdio.h>

main()
{
    char item[20];
    int partno;
    float cost;

    . . . . .

    printf("%s %d %f", item, partno, cost);

    . . . . .

}
```

```
fastener 12345 0.050000
```

```
printf("%s%d%f", item, partno, cost);
```

```
fastener123450.050000
```

# INPUT AND OUTPUT OF DATA

## THE printf() FUNCTION (cont.)

```
#include <stdio.h>

main()    /* display floating-point output 2 different ways */
{
    double x = 5000.0, y = 0.0025;

    printf("%f %f %f %f\n\n", x, y, x*y, x/y);
    printf("%e %e %e %e", x, y, x*y, x/y);
}
```

```
5000.000000 0.002500 12.500000 2000000.000000

5.000000e+03 2.500000e-03 1.250000e+01 2.000000e+06
```

# INPUT AND OUTPUT OF DATA

## THE printf() FUNCTION (cont.)

```
#include <stdio.h>

main()        /* minimum field width specifications */

{
    int i = 12345;
    float x = 345.678;

    printf("%3d %5d %8d\n\n", i, i, i);
    printf("%3f %10f %13f\n\n", x, x, x);
    printf("%3e %13e %16e", x, x, x);
}
```

```
12345 12345     12345

345.678000 345.678000     345.678000

3.456780e+02   3.456780e+02      3.456780e+02
```

# INPUT AND OUTPUT OF DATA

## Reading and Writing a Line of text

```
#include <stdio.h>

main()          /* read and write a line of text */
{
    char line[80];

    scanf(" %[^\n]", line);
    printf("%s", line);
}
```

```
The PITTSBURGH STEELERS is one of America's favorite football teams!
```

```
The PITTSBURGH STEELERS is one of America's favorite football teams!
```

# INPUT AND OUTPUT OF DATA

# Thank You

End of Lecture 4

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