Computer Programming

Dr. Deepak B Phatak
Dr. Supratik Chakraborty
Department of Computer Science and Engineering
IIT Bombay

Session: handling text data in files

Quick Recap and overview

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- We saw that normal text input and output is actually handled by C++ programs using files stdin and stdout
- We know that the standard input operator cin and cout handle convert ion of data from/to ASCII characters to/from internal representation
- We will study another powerful mechanism to handle text I/O and perform such conversion

Formatted input/output

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- Special functions to perform formatted input and output operations on stdin and stdout

  scanf() and printf()

- Parameters to these functions include a “format” string, followed by variables/expressions to be read/printed
- C++ applies the appropriate format pattern to each value
  - for interpreting characters in the input string and converting these to internal representation
  - for generating output string from given expressions

The printf() function

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- Converts values as per a specified format string

```
int roll = 12345,  int batch =112;
....
printf("%5d %3d\n", roll, batch)
```

This will produce the following output line on stdout

"12345 112\n"

printf("format-string", value, value, …)

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- This function displays one or more values on the user terminal

```
printf("%d is a number\n", N);
```

- If value of N is, say, 523, output produced by this function call is:

```
523 is a number
```

- This format string has a "format specifier" (%d), which is used to interpret N and convert it to a formatted value. Other characters are displayed as they are. \n introduces a new line
- 'Specifiers' can appear anywhere, each must correspond to a value appearing after the format string

Examples of format specifiers

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%6d - 6 digit integer

%7s - string fitted in 7 characters

%8.2f - float, 8 digits total, 2 after decimal point

%8.2g - same as float, switch to E notation if required

scanf("format-string", &var, &var, ..)

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```
int M, N; float x, y; char name[40];
scanf("%d %d %f %f %s", &M, &N, &x, &y, name);
```

- Any one of the following lines of text data will be interpreted correctly, with same values being assigned to variables

```
25   -78  .00763  345.29 Mynameischandra
   25     -78    7.63E-3  3.4529E2 Mynameischandra
```

Another example of scanf()

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```
 int a; float x; char itemcode[8];
// The input data line contains
//  123456fanbelt150.50
scanf("%6d%7s%f", &a, itemcode, &x);
printf("%6d\t%7s\t%6.2f\n", a, itemcode, x);
```

Executing scanf/printf

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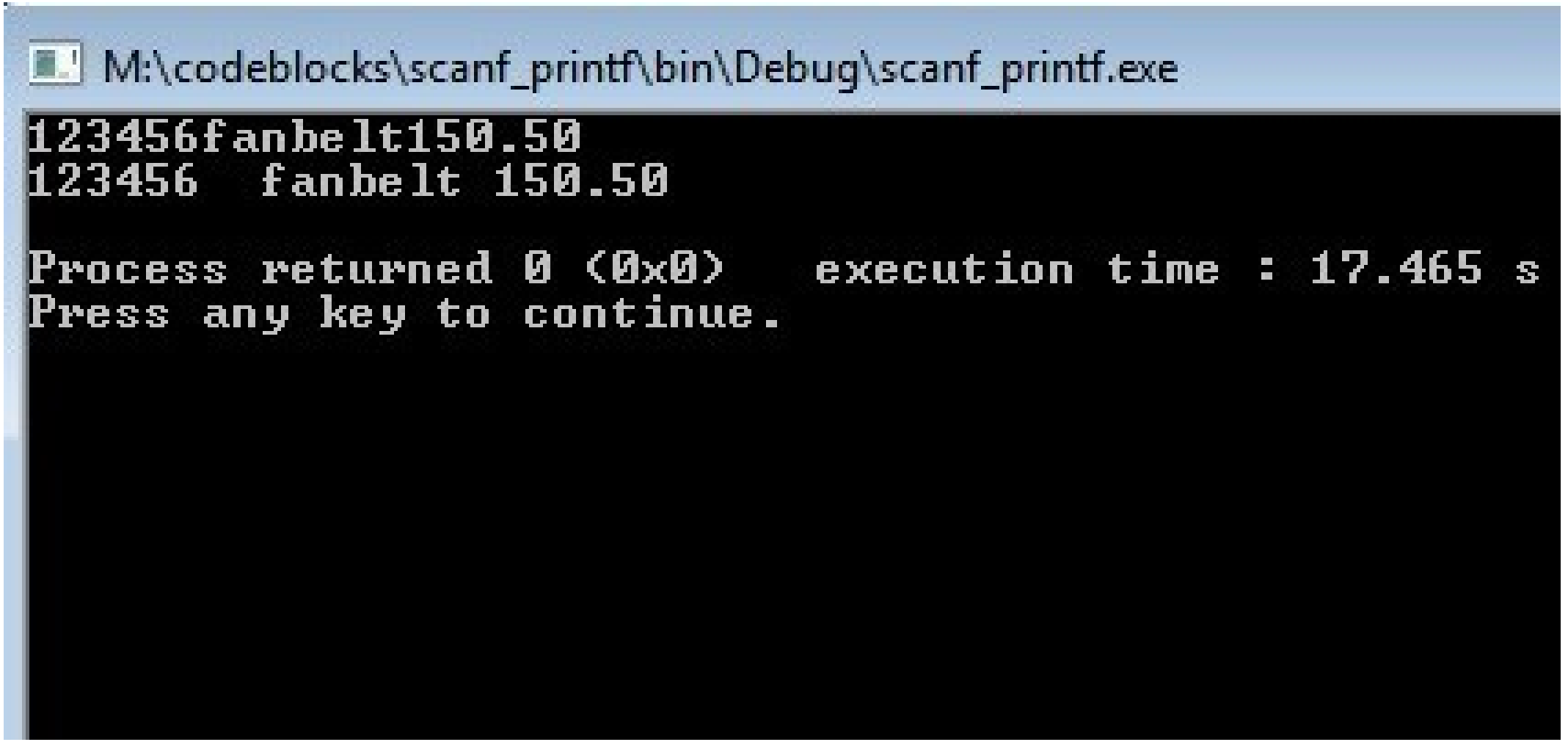

Different versions of these functions

- Interpret input values from a string/create an output string
  sprintf(s, “format string”, expression, expression, …)
  sscanf(s, “fomat-string”, &var1, &var2, …)

- Interpret input from a line, to be read from a text file
  fscanf(fpin, “fomat-string”, &var1, &var2, …)

- Output a formatted line to a text file
  fprintf(fpout, “format string”, expression, expression, …)

Summary

- We studied how to handle formatted text using functions scanf() and printf(); and their different versions

- Refer to C++ tutorials and reference section on the web at: http://www.cplusplus.com/reference

- Study different format specifiers