BYU
IDAHO

First Program / Output

CS 124 – Intro to Software Development

Macbeth – Lesson 2.1

Agenda

- Opening Prayer
- Scripture
- Q&A
  - Additional Linux Notes
  - Review Last Assignment
- Review next Project
- Generating Output
- Looking Ahead

BYU IDAHO

Spiritual Thought

D&C 50:22

Wherefore, he that preacheth and he that receiveth, understand one another, and both are edified and rejoice together.

BYU IDAHO

More Linux Notes

- Editor
  - `emacs` *`filename`*`.cpp &` (use emacs gui and command line at the same time)
  - `emacs -nw` *`filename`*`.cpp` (use non-gui emacs)
  - If you use mobaXterm, you can double click on the file and it will copy it to your hard drive and open an editor. When you save, it will copy it back to the linux server.
  - `gedit` and `vi` and `nano` are also available to use
- Follow the instructions in each assignment and project to run `styleChecker`, `testBed`, and `submit`.
- Assignments are auto-graded so make sure `testBed` works!
- Projects are auto-graded and hand-graded so make sure `testBed` works! Plan ahead and ask questions. If your project still does not pass `testBed` at the deadline, then submit what you have with comments in the code about what is not working.

BYU IDAHO

Review Last Assignment

- What was the hardest part?
- What lessons did you learn?

- When I share my code on the screen, please do not take pictures ☺

BYU IDAHO

02 Ponder – Monthly Budget Project

```
This program keeps track of your monthly budget
Please enter the following:
        Your monthly income: 1000.00
        Your budgeted living expenses: 650.00
        Your actual living expenses: 700.00
        Your actual taxes withheld: 100.00
        Your actual tithe offerings: 120.00
        Your actual other expenses: 150.00

The following is a report on your monthly expenses
        Item                 Budget          Actual
        ============== ============== ==============
        Income         $    1000.00    $    1000.00
        Taxes          $       0.00    $     100.00
        Tithing        $       0.00    $     120.00
        Living         $     650.00    $     700.00
        Other          $       0.00    $     150.00
        ============== ============== ==============
        Difference     $       0.00    $       0.00
```

Output with cout

- Output to the console screen is done with the `cout` stream.
- Streams use the << (used by `cout` for output) and >> (used by `cin` for input) notation
  - Later this week we will learn about the input stream (`cin`).
  - Later in this class we will learn about the file stream.
- Requires `#include <iostream>`

Code	Output
`cout << "Hello World"`	`Hello World`

Output Multiple Things at Once

- You can put text, numbers, or variables (we will see these later) after the <<
- You can combine multiple text, numbers, and variables into the same `cout` call
- You can split the single `cout` call into multiple lines (remember the style rule of no more than 80 characters per line)

Code	Output
`cout << "one" << "two"` `  << 3 << "four";`	`onetwo3four`
`cout << "one" << " two "` `  << 3 << " four";`	`one two 3 four`

BYU IDAHO

New Lines

- The `cout` command will not print on a new line unless you specifically tell it too.
- There are two ways to move to the next line:
  - `\n` – This must be in quotes … its text.
  - `endl` – This is not in quotes … its actually a function.

Code	Output

`cout << "line1\n";`
`cout << "line2" << endl << "\n";`
`cout << "line3" << endl;`
	`line1`
	`line2`
	
	`line3`

- When would `\n` be a better choice then `endl`?

BYU IDAHO

Tabs

- A tab will left-justify text by moving over 8 characters.
- `\t` – Just like `\n`, this must be in quotes.

```
cout << "abc\tdef\tghi\n";
cout << "rain\tspain\tplain";
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
a	b	c						d	e	f						g	h	i	\n				
r	a	i	n					s	p	a	l	n				p	l	a	l	n			

Code	Output

`cout << "Class Schedule\n";`
`cout << "\tCS124\n";`
`cout << "\tFDREL325\n";`
	`Class Schedule`
	`  CS124`
	`  FDREL325`

`cout << "Name\tPhone\tAddress\n";`	`Name  Phone  Address`

Quotes and Slashes

- The backward slash (\) and the quote (") are present in many `cout` calls to specify text and new lines.
- To display the backward slash or a quote to the screen you need to do something special:
  - `\\` - This will print a single backward slash (this is not a comment)
  - `\"` – This will print a single quote

Code	Output
`cout << "Nephi said, \"I will "` `  << "go and do\"\n";`	`Nephi said, "I will go and do"`
`Cout << "How to add a newline: "` `  << "\"\\n\" or endl\n"`	`How to add a new line: "\n" or endl`

Displaying Real Numbers

- When you print a real number (one with a decimal point), you can control how the decimal part of the number is displayed.
  - `cout.precision(2)` – Show two digits after the decimal point (useful for money)
  - `cout.setf(ios::fixed)` – Always show all the zero's after the decimal point up to the precision
  - `cout.setf(ios::showpoint)` – Always show the decimal point

Code	Output

`cout.precision(5);`
`cout.setf(ios::fixed);`
`cout.setf(ios::showpoint);`
`cout << "PI = " << 3.1415965359 << endl;`
`cout.precision(2);`
`cout << "PI = " << 3.1415965359 << endl;`
`cout.precision(7);`
`cout << "PI = " << 3.1415965359 << endl;`
	`PI = 3.14160`
	`PI = 3.14`
	`PI = 3.1415965`

BYU IDAHO

Right Aligning Text and Numbers

- Tabs perform left alignment. To perform right alignment, use the `setw` command.
- Requires `#include <iomanip>`
- `setw` applies only to the next output in the `cout` (unlike `precision` and `setf` calls)

```
cout << "abc" << setw(7) << "def" << "ghi" << setw(8) << "jkl\n";
cout << "One" << setw(7) << "Three" << "Two" << setw(8) << "Four";
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
a	b	c					d	e	f	g	h	i					j	k	l	\n			
O	n	e			T	h	r	e	e	T	w	o					F	o	u	r			

Right Aligning Text and Numbers

```
cout << "abc" << setw(7) << "def" << "ghi" << setw(8) << "jkl\n";
cout << "One" << setw(7) << "Three" << "Two" << setw(8) << "Four\n";
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
a	b	c					d	e	f	g	h	i					j	k	l	\n			
O	n	e			T	h	r	e	e	T	w	o				F	o	u	r	\n			

```
cout << "abc" << setw(7) << "def" << "ghi" << setw(8) << "jkl" << endl;
cout << "One" << setw(7) << "Three" << "Two" << setw(8) << "Four" << endl;
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
a	b	c					d	e	f	g	h	i						j	k	l	\n		
O	n	e			T	h	r	e	e	T	w	o					F	o	u	r	\n		

BYU IDAHO

Right Aligning Text and Numbers

Code

```
cout << "Description     Cost" << endl;
cout << "--------------- ----------" << endl;
cout << "Groceries       $" << setw(9) << 230.17 << endl;
cout << "Gas             $" << setw(9) << 65.32 << endl;
cout << "Books           $" << setw(9) << 24.25 << endl;
```

Output

```
Description     Cost
--------------- ----------
Groceries       $   230.17
Gas             $    65.32
Books           $    24.25
```

Looking Forward

- This is a summary of what is shown in I-Learn.

- This Evening
  - Make sure all quizzes are completed from last week
  - Submit assign10 by 11:59pm tonight

- Before Class on Wednesday
  - 1.1 Prepare
    - Read Chapter 1.1 Output
    - Submit assign11
  - 02 Ponder – Start work on your project – Monthly Budget (Due on Saturday)

BYU IDAHO