Problem Solving with Computing
COMP 480

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Today's "Menu"

- Overview
- Class Policies
- Introductions
- Basic Terminology
- A 'bit' of binary
- A bit of Python
- Exploration paper + Reflection Paper

Announcements

- Famous Programmer/CS – bonus points!
- Practice Practice Practice! (note: no books, notes, calculators etc during exams)
- Review ***Checkpoints*** in text (solutions on CD)
- Don't forget about Proctors

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  - Introduction to Programming for "newbies"
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- What this class is not:
  - "kinder & gentler" != no/little work
  - "easy A"
  - Don't fall behind! Road vs. High-rise building …
  - Advanced Programming or Python

Overview (2)

- Who you are:
  - Curious about programming
  - No (or *very* little) experience with programming
  - Willing to put in the effort to work hard
  - Considering COMP 111 or ITEC 136

Overview (2)

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- Who am I?
  - Enthusiastic about this class (proposed + designed it)
  - Lots of experience teaching "newbies"
  - High expectations of students
  - Enjoy teaching (esp newbies) + programming

Why Python?

- Minimal syntactic overhead
- Easy to learn, *lots* of on-line resources/tutorials
- Clean, intuitive and friendly syntax
- Free and multi-platform (incl. IDE)
- Many additional libraries freely available (e.g, PIL)
- Proven to appeal to new programmers
- Fun (can be used interactively too)
- Not a toy: Used by Google, NASA, YouTube, …

Hello World

```
// Hello World in Java

public class HelloWorld
{
   public static void main(String[] args)
   {
        System.out.println("Hello World.");
   }
}
```


Hello World

```
// Hello World in C++

#include <iostream>
using namespace std;

int main(void)
{
    cout << "Hello World\n";
    return 0;
}
```

Hello World

```
// Hello World in Python 2.6

print 'Hello World'
```


Misc Items

- Distinguish between ***our 'class' web page*** (dynamic) **vs**. FU web page (somewhat static)
- Important to keep an eye on both – but especially the 'class' page
- e-mail works better! *Esp if done right*
- *Read* all materials written up for *you*.
- Expect e-mails Mon/Tue

Introductions

- Your name? (special preferences?)
- Where you are from?
- Why are you here?
- Job and/or major?
- Hobby and/or major surprise.

A bit of Binary (1)

- Bit – **b**inary dig**it**
- Byte – 8 bits
- Meaning of bits open to interpretation
- Use of *positional notation*
- Base 10 (decimal), 2 (binary), 8 (octal) and 16 (hexadecimal) are common
- Powers of 2 used for binary

Decimal

- Powers of 10 used for decimal (a.k.a. base 10)
- Each 'digit' position is a power of 10
- Valid digit values: 0 – 9 (note, 0 to base-1)
- Example:

132 = 1 x 100 + 3 x 10 + 2 x 1

= 1 x 10^2 + 3 x 10^1 + 2 x 10^0

So each value in a position is multiplied by a power of 10 .. Another view:

1		3		2
x		x		x
100	+	10	+	1 = 132

A bit of Binary (2)

- Powers of 2 used for binary (base 2)
- Each 'digit' position is a power of 2
- Valid digit values: 0 – 1 (note, 0 to base-1)
- Example:
- 1101_2 = 1 x 8 + 1 x 4 + 0 x 2 + 1 x 1

= 1 x 2^3 + 1 x 2^2 + 0 x 2^1 + 1 x 2^0

So each value in a position is multiplied by a power of 10 .. Another view:

1		1		0		1_2
x		x		x		x
8	+	4	+	2	+	1 = 13_{10}

Examples

$0\ \ 1\ \ 1\ \ 0\ \ 1_2 =$

$1\ \ 1\ \ 0_2 =$

More examples

All binary numbers:

0 1 1 0 1

1 0 0 1 0

0 0 1 1 1

Summary/Recap

- Questions?