Exam Revision

Lecture 27 & Lecture 28 – COMPSCI111/111G SS 2017

Today's lecture

- ▶ Topics
- ▶ Exam Overview
- ▶ How to prepare for your exam
- ▶ Exercises

Exam Overview

- Time Allowed: TWO hours
- You must answer all questions in this exam.
- Calculators are NOT permitted.
- Answer Section A (Multiple choice questions) on the Teleform answer sheet provided.
- Answer Section B in the space provided in this booklet.
- 100 marks

Exam Overview

- Section A: Multiple choice questions
  - 30 questions, 1 mark each
  - Topics:
    - Introduction / Hardware, components of a computer system
    - Bits, bytes, digital information
    - Software, licences, conventions
    - Introduction to networking and the Internet
    - Electronic Communication and the Internet
    - Publishing online using tools - blogs, wikis
    - The World Wide Web, search engines, trusting information
    - Word processing, preferences, styles, references using RefWorks
    - History of Computing
    - Social, Legal Issues and Ethical Issues
    - Digital Game Design
    - Artificial intelligence
    - Vector Graphics

Exam Overview

▶ Section B: Short answer questions

   ▶ 5 questions, 70 marks in total

   ▶ Topics:

      ☐ Programming in Python (10 marks)

      ☐ Spreadsheets (10 marks)

      ☐ HTML 5 & CSS (20 marks)

      ☐ Latex (15 marks)

      ☐ Databases (15 marks)

Exam Preparation - tips

▶ 1. Give yourself enough time to study

  ▶ Don't leave it until the last minute.

▶ 2. Organize your study space

  ▶ Have you got enough light?

  ▶ Is your chair comfortable?

  ▶ Are your computer games out of sight?

▶ 3. Use flow charts and diagrams

  ▶ Visual aids can be really helpful when revising

  ▶ At the start of a topic, challenge yourself to write down everything you already know about a topic

  ▶ Closer to the exam, condense your revision notes into one-page diagrams

Study tips

- 4. Finding Out What Goes Into the Exam
    - You can get a pretty good idea of what goes into the exam from looking at past papers

- 5. Getting Comfortable with the Exam Experience
    - Get a feeling for how the exam experience will be like by doing some past semesters' exams.

- 6. Explain your answers to others
    - That will help you to get it clear in your head, and also to highlight any areas where you need more work.

Study tips

- 7. Organize study groups with friends
    - You may have questions that they have the answers to and vice versa.
    - this can be one of the most effective ways to challenge yourself.

- 8. Take regular breaks
    - If you study better in the morning, start early before taking a break at lunchtime.
    - Remember Vitamin D is important for a healthy brain!

- 9. Snack on 'brain food'
    - Keep your body and brain well-fuelled by choosing nutritious foods that have been proven to aid concentration and memory

Study tips

- 10. Plan your exam day
  - Make sure you get everything ready well in advance of the exam
  - The exam is in the morning so set your alarm the night before.
  - Check all the rules and requirements, and plan your route and journey time.

Exercises (Lecture 6)

▶ Wiki markup:

  ▶ = : headings

  ▶ Formatting:

    ▶ '' (emphasis)

    ▶ ''' (strong)

    ▶ ''''' (very strong)

  ▶ [[ ]] : internal link

  ▶ [URL label] : external link

  ▶ Lists:

    ▶ * : Unordered

    ▶ # : ordered

Question 9

[2 marks] Which of the following would be used in the Stage One Wiki to add a link to an internal page named CS Department?

```
(a) CS Department
(b) [[CS Department]]
(c) [CS Department]
(d) [[[CS Department]]]
```

Question 12

[2 marks] Which of the lists below is produced by the following Wiki markup?

```
*Best Games of 2015:
*#Rise of the Tomb Raider
*#The Witcher 3
```

(a)
- Best Games of 2015:
  - Rise of the Tomb Raider
  - The Witcher 3

(b)
1. Best Games of 2015:
   1. Rise of the Tomb Raider
   2. The Witcher 3

(c)
- Best Games of 2015:
  1. Rise of the Tomb Raider
  2. The Witcher 3

(d)
1. Best Games of 2015:
   - Rise of the Tomb Raider
   - The Witcher 3

(e) None of the above.

How much memory is required?

One binary number used for each pixel
- 1 bit   2 colours
- 2 bits   4 colours
- 4 bits   16 colour
- 8 bits   256 colours
- 16 bits   65536 colours
- 24 bits   16,777,216 colours

How many bits are required for a 16 colour image 100 pixels wide x 8 pixels high?
- 100x8x4 = 3200 bits = 400 bytes

Question 20

[2 marks] How many bytes are required to store an image that is 100 pixels wide, 40 pixels high, and uses 16 colours?

(a) 16,000 bytes.

(b) 1500 bytes.

(c) 2000 bytes.

(d) 12,000 bytes.

(e) None of the above.

16 colours -> 4 bits, i.e.
100x 40 x 4 = 16000 bits

…

Question 20

[2 marks] If we reduce a 24-bit colour image that is 1 megabyte in size to 16 colours, what will be its new size?

(a) 1/4 of a megabyte.

(b) 1/16 of a megabyte.

(c) 2/3 of a megabyte.

(d) 1/6 of a megabyte.

16 colours -> 4-bit,
   i.e. 24-bit -> 4-bit

 …

▶ ## Consider the following:

<center>

The Fibonacci Sequence

Leonardo Filius Bonacci

November 1241

</center>

Normal commands	Environments	Math mode commands
\emph{}	itemize	$
\section{}	enumerate	\sqrt{}
\subsection{}	verbatim	\infty
\subsubsection{}	flushright	\frac{}{}
\large	center	\left(
\textbf{}	quote	\right)
\title{}	displaymath	\geq
\author{}	equation	\sum_{}^{}
\date{}	quotation	\ldots
\maketitle		^
\item		_

1 Introduction

Rabbit populations can be described by the following recursive sequence:

- $a_0 = 0$

- $a_1 = 1$

- $a_{n+2} = a_n + a_{n+1}$ for each $n \geq 0$.

2 An explicit expression

$$a_n = \left(\frac{1 + \sqrt{5}}{2}\right)^n - \left(\frac{1 - \sqrt{5}}{2}\right)^n. \tag{1}$$

The number $\frac{1+\sqrt{5}}{2} = 1.61803\ldots$ is called the **golden ratio**.

▸ **Title**

```
\title{...}
\author{Leonardo ...}
\date{November 1241}
\maketitle
```

The Fibonacci Sequence

Leonardo Filius Bonacci

November 1241

1 Introduction

Rabbit populations can be described by the following recursive sequence:

- $a_0 = 0$
- $a_1 = 1$
- $a_{n+2} = a_n + a_{n+1}$ for each $n \geq 0$.

▸ **Introduction**

```
\section{Introduction}

\emph{Rabbit populations} can be...

\begin{itemize}
\item $a_0 = 0$
\item $a_1 = 1$
\item $a_{n+2} = a_$n + a_$(n+1)$ for each $n \geq 0$
\end{itemsize}
```

▸ ## Section:

\section{An ... }

\begin{equation}
a_n = \left (\frac{1 + \sqrt 5} {2} \right)^n - \left(\frac{1 - \sqrt 5} {2} \right) ^ n
\end{equation}

The number $ \frac{1 + \sqrt 5} {2} = 1.61803 \ldots$ is called the \textbf {golden ratio}.

2 An explicit expression

$$a_n = \left(\frac{1 + \sqrt{5}}{2} \right)^n - \left(\frac{1 - \sqrt{5}}{2} \right)^n . \tag{1}$$

The number $\frac{1+\sqrt{5}}{2} = 1.61803\ldots$ is called the **golden ratio**.

- **Square roots**
  - \sqrt{ ... }
  - Example: \sqrt{ x^2 + y^2 } $\sqrt{x^2 + y^2}$

- **Fractions**
  - \frac{ numerator } { denominator }
  - Example: 3\frac{ 1 }{ 2 } $3\frac{1}{2}$

- **Sum**
  - \sum
  - Example: \sum_{k=1}^{n} k $\sum_{k=1}^{n} k$

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▸ Consider the following:

Main Heading

National parks of South Africa

South Africa has a large number of national parks. The *most famous* is Kruger National Park, with an area of 19,485 square km.

Introductory Paragraph

The two oldest national parks in South Africa

Park	Year founded
Kruger National Park	1926
Bontebok National Park	1931

section

List of the most danger...

If you see any of these and you are not in your vehicle, **Run!**

- Lion
- Cheetah
- Hippopotamus

```
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>HTML5 Exam Question</title>
<style type="text/css">
h1, h2 { background-color: #000000; text-align: center;
         font-family:sans-serif; color: #FFFFFF; }
table, tr, td { border: 1px solid black;}
#tableheader { font-size: large; font-weight: bold; font-style: italic; }
.emphasis { font-size: large; font-weight: bold; }
#sloping { font-style: italic; }
</style>
</head>
```

Solution

#idName { property: value; }
- Define a style that can be applied to a single tag
- Use id="..."

```
#tableheader { font-size: large; font-weight: bold; font-style: italic; }
.emphasis { font-size: large; font-weight: bold; }
#sloping { font-style: italic; }
```

▸ Main Heading

```
<h1>National... </h1>
<p>South Africa has ...The <span        ="sloping"> most famous </span> is <a href =
"http://www.sanparks.org/parks/kruger/"> Kruger National Park</a> ...</p>
```

▸ Introductory Paragraph

```
<section> <h2>The two oldest ... </h2>
<table>
<tr        = "tableheader"><td>Park</td><td>Year founded</td></tr>
<tr><td>Kruger National Park</td><td>1926</td></tr>
<tr><td>Bontebok National Park</td><td>1931</td></tr>
</table>
</section>
```

National parks of South Africa

South Africa has a large number of national parks. The *most famous* is Kruger National Park, with an area of 19,485 square km.

The two oldest national parks in South Africa

Park	Year founded
Kruger National Park	1926
Bontebok National Park	1931

Solution

.className { property: value; }
- Define a style that can be applied to a group of tags
- Use class="..."

```
#tableheader { font-size: large; font-weight: bold; font-style: italic; }
.emphasis { font-size: large; font-weight: bold; }
#sloping { font-style: italic; }
```

▸ **section**

```
<section>
<h2> List of the ...</h2>
<p>If you see any of these ...vehicle, <span class="emphasis"> Run!</span></p>
<ul>
<li>Lion</li>
<li>Cheetah</li>
<li>Hippopotamus</li>
</ul>
</section>
```

List of the most dangerous animals

If you see any of these and you are not in your vehicle, **Run!**

- Lion
- Cheetah
- Hippopotamus

Spreadsheets (Lecture 18-19)

▶ **Excel Formulas:**

  ▶ Average, sum etc

    ▶ =AVERAGE(number1, [number2], …)

    ▶ =AVERAGE(B1:B3)

The following spreadsheet calculates the classification for 6 earthquakes whose magnitude has been measured using the Richter scale. The "**Building Damage**" column contains the word "Yes" if the magnitude of the earthquake is 5 or more on the Richter scale, and "No" otherwise.

	A	B	C	D	E	F	G	H	I
1	Location	Country	Date	Magnitude	Building Damage	Classification		Magnitude	Classification
2	Dallas	USA	30/09/2012	3.5	No	Minor		0	Micro
3	Kobe	Japan	17/01/1995	6.8	Yes	Strong		2	Minor
4	Tocopilla	Chile	14/11/2007	7.5	Yes	Major		4	Light
5	Pernik	Bulgaria	22/05/2012	5.6	Yes	Moderate		5	Moderate
6	Kent	England	28/04/2007	4.3	No	Light		6	Strong
7	Lisbon	Portugal	01/11/1755	9	Yes	Great		7	Major
8			Mean Magnitude	6.1				8	Great

(a) Cell **D8** calculates the mean magnitude of all the earthquakes recorded in this spreadsheet. What is the best formula to use in cell **D8**?

Spreadsheets

- If function:
  - IF(logical_test, value_if_true, value_if_false)

The following spreadsheet calculates the classification for 6 earthquakes whose magnitude has been measured using the Richter scale. The "Building Damage" column contains the word "Yes" if the magnitude of the earthquake is 5 or more on the Richter scale, and "No" otherwise.

	A	B	C	D	E	F	G	H	I
1	Location	Country	Date	Magnitude	Building Damage	Classification		Magnitude	Classification
2	Dallas	USA	30/09/2012	3.5	No	Minor		0	Micro
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4	Tocopilla	Chile	14/11/2007	7.5	Yes	Major		4	Light
5	Pernik	Bulgaria	22/05/2012	5.6	Yes	Moderate		5	Moderate
6	Kent	England	28/04/2007	4.3	No	Light		6	Strong
7	Lisbon	Portugal	01/11/1755	9	Yes	Great		7	Major
8		Mean Magnitude		6.1				8	Great

What is the best formula to use in cell **E2**? Your answer must use an IF function and must be able to be filled down from **E2** to **E7** correctly.

Spreadsheets

▶ **Vlookup function**

    ▶ 'looks up' a given value in the left-hand column of a data array (or table), and returns the corresponding value from another column of the array.

    ▶ VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

        ▶ Range_lookup: True if we want to match a range of values; False if we want an exact match.

        ▶ Don't forget to use absolute references for the table array

The following spreadsheet calculates the classification for 6 earthquakes whose magnitude has been measured using the Richter scale. The "Building Damage" column contains the word "Yes" if the magnitude of the earthquake is 5 or more on the Richter scale, and "No" otherwise.

	A	B	C	D	E	F	G	H	I
1	Location	Country	Date	Magnitude	Building Damage	Classification		Magnitude	Classification
2	Dallas	USA	30/09/2012	3.5	No	Minor		0	Micro
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6	Kent	England	28/04/2007	4.3	No	Light		6	Strong
7	Lisbon	Portugal	01/11/1755	9	Yes	Great		7	Major
8		Mean Magnitude		6.1				8	Great

What is the best formula to use in cell **F2?**

Python

(a) Write a Python program that prompts the user for two positive integer numbers. The user may enter numbers which are positive, zero, or negative. If both numbers entered by the user are positive the program should print out the *first number to the power of the second number* (as in Example 1 below), otherwise if at least one of the numbers entered by the user is not a positive number the program should tell the user that they have entered an invalid number (as in Example 2 below).

The following **two examples** show the exact formatting expected for the prompts and output. Your program must produce the same output as shown below, given the example input shown below.

Example 1:
```
Enter a positive integer: 2
Enter a second positive integer: 3
2 to the power of 3 is 8
```
Example 2:
```
Enter a positive integer: -8
Enter a second positive integer: 3
You have entered a number that is not positive.
```

▸ Steps:

  ▸ Ask for two positive integers

  ▸ Convert two strings into two integers

  ▸ Check for positive/negative numbers

  ▸ Print the result

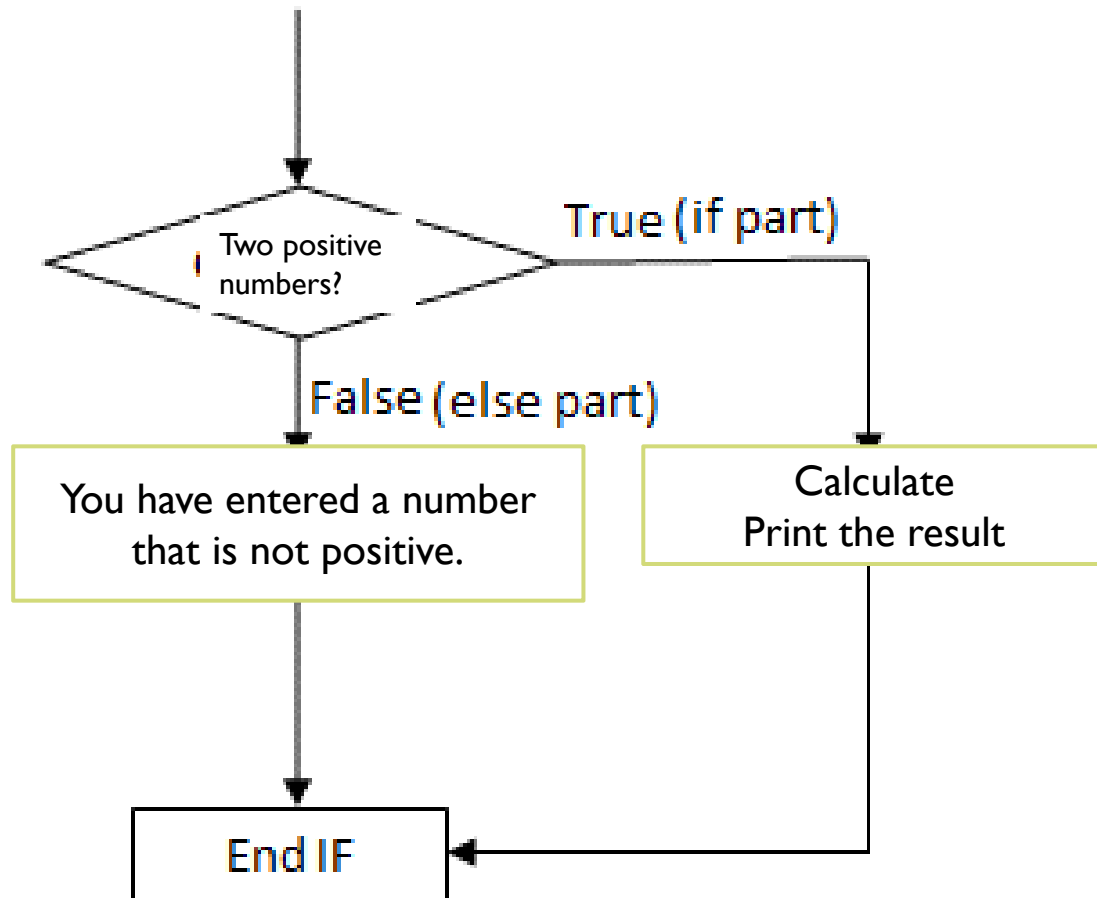Case 1: +2, +3 (both +ve)=> 2 to the power of 3 is 8
Case 2: -2, +3 … not positive
Case 3: +2, -3 … not positive
Case 4: -2, -3 … not positive

▶ Condition:

(b) Show the output from the following program.

```
count = 2
end = 7
while count < end:
    n = (count - 1) * count // 2
    print(n)
    count = count + 1
```

▸ Count: 2

▸ End: 7

▸ Output:

Turtle

```
import turtle

steps = 50
angle = 90
sides = 8
count = 0

while count < sides:
    if count < 4:
        turtle.forward(steps)
        turtle.left(angle)
    else:
        turtle.forward(steps*2)
        turtle.right(angle)
    count = count + 1
```

▸ output: