

THE UNIVERSITY OF AUCKLAND

SECOND SEMESTER, 2010
Campus: City

COMPUTER SCIENCE

Mastering Cyberspace: An Introduction to Practical Computing

(Time Allowed: TWO hours)

NOTE:

You must answer **all** questions in this exam.

No calculators are permitted

Answer Section A (Multiple choice questions) on the Teleform answer sheet provided.

Answer Section B in the space provided in this booklet.

There is space at the back for answers that overflow the allotted space.

Surname	
Forenames	<i>Sample</i>
Student ID	<i>Answers</i>
Login (UPI)	

	Question	Mark	Out Of
1 - 25	Multiple Choice		50
26	Programming using Python		10
27	Spreadsheets		10
28	Databases		10
29	LaTeX		10
30	XHTML and CSS		10
	TOTAL	100	100

Question 1

[2 marks] Which of the following decimal numbers is equal to the binary number 0001 0111?

- (a) 232
- (b) 32
- (c) 46
- (d) 116
- (e) 23**

Question 2

[2 marks] Which of the following is equal to 1,099,511,627,776 bytes?

- (a) 1 mebibyte
- (b) 1 gibibyte
- (c) 1 kibibyte
- (d) 1 pebibyte
- (e) 1 tebibyte**

Question 3

[2 marks] Which of the following hardware can information be read from the fastest?

- (a) DVD
- (b) RAM**
- (c) HDD
- (d) CD
- (e) USB Flash drive

Question 4

[2 marks] Performance of hardware components is measured in different ways. Which of the following hardware components is measured in hertz?

- (a) Broadband modem
- (b) HDD
- (c) Power supply
- (d) CPU**
- (e) Laser Printer

Question 5

[2 marks] Which of the following statements is FALSE?

- (a) Shareware is proprietary software
- (b) Software can be patented but not copyrighted**
- (c) Open source software can be legally copied
- (d) Proprietary software is sometimes free
- (e) Free Software can be legally modified

Question 6

[2 marks] Which of the following is NOT an operating system?

- (a) Microsoft DOS
- (b) Windows 7
- (c) Linux
- (d) Macintosh OSX
- (e) Microsoft Office**

Question 7

[2 marks] Which of the following lists contains events in chronological order from earliest to latest?

- (a) Sputnik launched**
ARPANET created
TCP/IP created
NZ joins Internet
- (b) ARPA formed
Sputnik launched
DNS created
ARPANET created
- (c) ARPA formed
ARPANET created
NZ joins Internet
DNS created
- (d) TCP/IP created
ARPA formed
DNS created
NZ joins Internet
- (e) Sputnik launched
ARPA formed
NZ joins Internet
TCP/IP created

Question 8

[2 marks] What is the purpose of the domain name system?

- (a) **It converts domain names into Internet Protocol addresses**
- (b) It prevents people from accessing ports on a computer without permission
- (c) It is an organization that decides which top-level domains to create
- (d) It manages the ownership of domain names
- (e) It is used to translate domain names from IPv4 to IPv6

Question 9

[2 marks] What protocol was designed specifically for transferring hypertext documents?

- (a) POP3
- (b) IMAP
- (c) **HTTP**
- (d) FTP
- (e) TCP/IP

Question 10

[2 marks] Which of the following statements about the WWW is FALSE?

- (a) **The WWW is a network of networks that communicate via TCP/IP**
- (b) Originally, the WWW was not designed to be used for business transactions
- (c) Tim Berners Lee developed the WWW at CERN
- (d) A WWW cache speeds up web page access by storing local copies of resources
- (e) When you view a web page, the web server can record your IP address

Question 11

[2 marks] Assuming you send an email that has addresses listed in the TO, CC and BCC fields, which of the following statements is TRUE?

- (a) **The recipients listed in the TO field can't see the addresses of people listed in the BCC field.**
- (b) The recipients listed in the CC field can see the addresses of people listed in the BCC field.
- (c) The recipients listed in the BCC field can't see the addresses of the people listed in the CC field.
- (d) The recipients listed in the BCC field can't see the addresses of the people listed in the TO field.
- (e) The recipients listed in the TO field can't see the addresses of people listed in the CC field.

Question 12

[2 marks] What is one major advantage of using a style sheet (user defined styles) in MS Word?

- (a) **You can ensure that the appearance of a given structure is consistent by applying the named style rather than applying a series of individual formatting changes.**
- (b) You can apply multiple styles to the same content which makes the page look more interesting compared with pages that have fewer styles.
- (c) Applying a style to the structure of the page ensures that serif fonts are used for printed documents and sans-serif fonts are used for documents displayed on screen.
- (d) Using a style sheet allows you access to a greater variety of formatting options compared with the formatting that can be applied from the main menus.
- (e) It is faster to save and transfer a document over the web if you have used a style sheet since documents that use a style sheet are more efficient.

Question 13

[2 marks] Given that the letter 'A' is represented by 65 in ASCII and the letter 'a' is represented by 97 in ASCII, which sequence represents the word 'fed' in ASCII?

- (a) 68 69 70
- (b) **102 101 100**
- (c) 70 69 68
- (d) 100 101 102
- (e) none of the above

Question 14

[2 marks] How much memory is required to represent an image that uses 16 colours and is 800 pixels wide and 1 pixel high?

- (a) 1600 bytes
- (b) 100 bytes
- (c) **400 bytes**
- (d) 200 bytes
- (e) 800 bytes

Question 15

[2 marks] What is one major difference between Vector graphics and Bitmap graphics?

- (a) A bitmap can use 24-bit colour, but a vector graphics image is limited to 8-bit colour
- (b) A vector graphics image can be printed on a laser printer but a bitmap can only be displayed on a screen
- (c) **A vector graphics image can be scaled up to any size with no visible loss in quality, but a bitmap cannot.**
- (d) Vector graphics images are a lossy format, but bitmaps are a non-lossy format.
- (e) A bitmap takes much less memory to store than a vector graphics image.

Question 16

[2 marks] What is a PowerPoint “Slide Master”?

- (a) Creating a stand-alone presentation to maximize compatibility with unknown operating systems
- (b) The view that allows you to adjust the timing of individual slides
- (c) A person certified by Microsoft to deliver PowerPoint presentations
- (d) The first slide that appears in a PowerPoint presentation
- (e) A template that defines the appearance of slides in a presentation**

Question 17

[2 marks] What does the “3-click rule” mean?

- (a) For improved accessibility on mobile applications, well designed web sites should include the ability to double-tap (2-click) or triple-tap (3-click) to perform additional functions.
- (b) You should be able to navigate from one page in a web site to any other page in the web site by clicking a maximum of 3 links.**
- (c) On average, a user browsing a web site clicks on only 3 different links within the web site.
- (d) A well designed web site will have a maximum of 3 hyperlinks on each page.
- (e) Amazon obtained a patent for shopping using only 3-clicks, so pages cannot use the 3-click rule for shopping.

Question 18

[2 marks] What is texture mapping?

- (a) A process that animates three-dimensional shapes using complex physics engines to simulate reality
- (b) A technique that maps a bitmap image onto a three-dimensional shape.**
- (c) A method of creating new textures
- (d) An approach that takes an existing texture and uses it to generate fractal terrain
- (e) A three-dimensional shape that uses a polygon mesh with a very high polygon count

Question 19

[2 marks] What is the underlying assumption of the Turing test?

- (a) Intelligence is a result of biology, so computers can never exhibit intelligence.
- (b) A computer is intelligent if it can perform a specific task traditionally thought to require intelligence.
- (c) The internal process used to make decisions determines whether a computer is intelligent.
- (d) Computers are already intelligent, but we need to determine the degree of intelligence.
- (e) A computer is intelligent if it behaves in the same way as a person.**

Question 20

[2 marks] What is the Chinese Room?

- (a) A thought experiment that is used to argue against strong AI**
- (b) An innovative AI research facility based in China
- (c) An attempt by Searle to create a program that translates Chinese to English
- (d) A strategy used by Deep Blue to win a chess match against Kasparov in 1997
- (e) A proverb used to illustrate the problem of combinatorial explosion

Question 21

[2 marks] Which two people started Microsoft?

- (a) Bill Gates and Ed Roberts
- (b) Bill Gates and John Warnock
- (c) Bill Gates and Paul Allen**
- (d) Bill Gates and Steve Jobs
- (e) Bill Gates and Gordon Moore

Question 22

[2 marks] What was the main reason that Apple computers had become so popular by 1980?

- (a) Apple computers supported desktop publishing software that used postscript and laser printers to produce high quality printed documents.
- (b) MS-DOS was harder to use than the Apple operating system
- (c) Apple sold more computers because they were cheaper than the more powerful Altair 8800.
- (d) IBM personal computers were created from “off-the-shelf” components
- (e) The first spreadsheet application only ran on an Apple computer**

Question 23

[2 marks] Which of the following statements about parents controlling their children's access to the Internet is **false**?

- (a) Blocking software allows a user to view sites on a black list, but it maintains a log so that parents can review what their children have been viewing.**
- (b) Filtering can be done on the home computer, by the ISP or by other web companies.
- (c) Filtering software can block sites which contain certain words, phrases or images.
- (d) Blocking software can be used to only allow access to white list addresses.
- (e) Software that limits access based on IP address is less likely to prevent access to acceptable content compared with software that limits access based on words, phrases or images.

Question 24

[2 marks] Which one of the following statements is **true**?

- (a) The Internet Worm was a Trojan designed to infiltrate academic institutions
- (b) Worms are programs that replicate through a network by copying themselves**
- (c) Computer viruses cannot be transferred using a USB flash drive
- (d) A logic bomb is an error in a program that is accidentally left in by a programmer
- (e) Viruses cannot be transferred through email attachments

Question 25

[2 marks] What did the Therac-25 case involve?

- (a) The Mars Therac Orbiter which used imperial units instead of the metric system and subsequently failed to land correctly
- (b) A radiation therapy machine which caused injury and death because of software and user error**
- (c) A faulty computer chip that almost caused a nuclear war by reporting 25 missiles had been launched
- (d) A rocket that exploded due to conversion errors from floating point to integer
- (e) The secret control codes which were used to blow up an oil pipeline in Western Russia

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SECTION B

Answer all questions in this section in the space provided. If you run out of space then please use the Overflow Sheet and indicate in the allotted space that you have used the Overflow Sheet.

26. Programming Using Python (10 marks)

- (a) Show the output from the following program. Show each space in the output with the “^” character.

```
print("COMPSCI",111,"G")
year = 2010
print("year",year)
print(year // 100 , year % 100)
```

COMPSCI^111^G
year^2010
20^10

(3 marks)

- (b) Write a Python program that calculates the area of a right-angled triangle given the length of the two shortest sides (to calculate the area, multiply the sides together and divide by two). The following examples show the exact formatting expected for the prompts. Your program must produce the same output as shown below given the input shown below.

Example 1:

```
Length of shortest side? 10
Length of medium side? 3
The area is: 15.0
```

Example 2:

```
Length of shortest side? 7
Length of medium side? 5
The area is: 17.5
```

```
shortest = int(input("Length of shortest side? "))
medium = int(input("Length of medium side? "))
area = shortest * medium / 2
print("The area is:", area)
```

(4 marks)

- (c) Show the output from the following program. Show each space in the output with the “^” character.

```
end = 4
count = 2
sum = 0
while count < end:
    sum = sum + count
    print(sum)
    count = count + 1
print("Sum", sum)
```

```
2
5
Sum^5
```

(3 marks)

27. Spreadsheets (10 marks)

The following Microsoft Excel spreadsheet is used to create an invoice for toy library rentals. To generate a new invoice, the user enters a toy code and the spreadsheet will locate the name and price corresponding to the code. A customer is eligible for a “bulk discount” if the cost of the toy rental reaches or exceeds the threshold value.

	A	B	C	D	E
1	Toy Details				
2	Code	Toy Name	Manufacturer	Batteries	Price
3	1102	Thomas and Friends Emily	Learning Curve	No	\$0.50
4	1054	Pawzee Flashlight	Little Tikes	Yes	\$0.50
5	1088	Rockin' Puppy	Little Tikes	No	\$0.50
6	2043	Lego Duplo Brick Box	Lego	No	\$0.50
7	2046	Rock-a-stack	Fisher-Price	No	\$0.50
8	2099	Color Kaleidoscope	Kids II	Yes	\$0.50
9	2583	Hullabaloo Game	Cranium	Yes	\$1.00
10	2983	Busy Ball Choo Choo	Hasbro	Yes	\$2.00
11	3014	Kettrike Air Happy	Kettler	No	\$0.50
12	3055	Cinderella's Royal Horse	Mattel	No	\$1.00
13					
14	Discounts				
15	Threshold	\$3.00			
16	Discount	15%			
17					
18	Invoice				
19	Code	Name	Price		
20	1088	Rockin' Puppy	\$0.50		
21	2043	Lego Duplo Brick Box	\$0.50		
22	2983	Busy Ball Choo Choo	\$2.00		
23	3055	Cinderella's Royal Horse	\$1.00		
24					
25	Subtotal		\$4.00		
26	Discount		15%		
27					
28	Total Due		\$3.40		

- (a) What is the best formula to use in Cell C20? Your formula should look up the code in the Toy Details table and retrieve the price of the toy. Note: You must ensure that your formula is able to be filled down.

The syntax of the **vlookup** function to search the first column of a table, and then return a value from any cell on the same row of the table is given below:

`vlookup(lookup_value, table_array, col_index_num, [range_lookup])`

`=vlookup(A20, A3:E12, 5, false)`

(4 marks)

- (b) What is the best formula to use in C26? Your formula should check to see if the subtotal in C25 has reached the threshold listed in B15. If the subtotal is equal to or bigger than the threshold, then the discount in cell B16 should be shown, otherwise a discount of 0% should be shown. Note: you should use an IF function in this cell.

The syntax of the **if** function is listed below:

```
if(logical_test, [value_if_true], [value_if_false])
```

```
=if(C25 >= B15, B16, 0)
```

(3 marks)

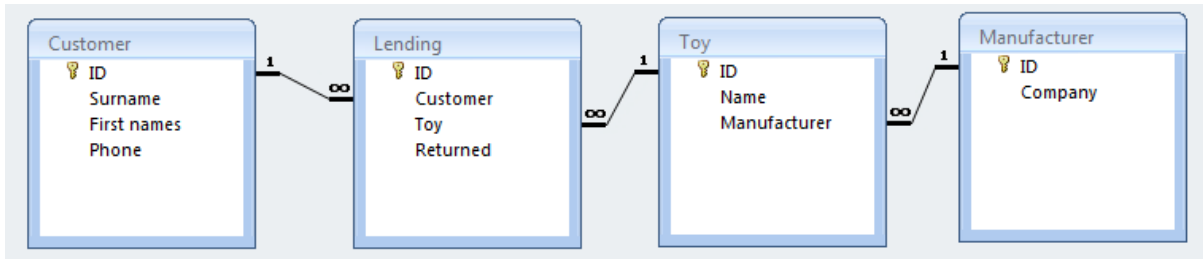
- (c) What is the best formula to use in C28? Your formula should calculate the total due by calculating the discount using C26 and subtracting the discount amount from the subtotal in C25.

```
= C25 - C26 * C25
```

(3 marks)

28. Databases (10 marks)

Use the following Microsoft Access relationship diagram to answer the questions in this section. This simple database structure is used by a toy library. Note that the primary key of each table uses the AutoNumber type to ensure uniqueness.



(a) What is the **foreign key** of the Toy table?

Manufacturer

(2 marks)

(b) What is an appropriate **data type** for the **Customer** field of the **Lending** table?

Number

(2 marks)

(c) Fill in the query-by-example form so that it generates a query that will display a list of customers who have borrowed toys and not yet returned them, along with the names of the toys that they have not returned. An example of the results of the query is given below:

Surname	Name
Simpson	Sleepy Susan
Griffin	Rocking Horse
Simpson	Turtle Pull-Along

Note that the **Returned** field holds boolean values (i.e. either TRUE or FALSE).

Field:	Surname	Name	Returned	
Table:	Customer	Toy	Lending	
Sort:				
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria:			FALSE	

(3 marks)

- (d) According to the relationship diagram, can the database store two toys with the same **Name** but different **Manufacturer id**? Explain why, with specific reference to the fields in the **Toy** table.

Yes. Name is not the primary key so it does not need to be unique.

(3 marks)

29. LaTeX (10 marks)

Write the LaTeX code that will produce the following output:

Latex

Andrew Luxton-Reilly

September 30, 2010

1 Correlations

Two kinds of correlations are:

1. Reflective correlation
2. Pearson's correlation

1.1 Reflective correlation

The sample reflective correlation is:

$$r_{xy} = \frac{\sum x_i y_i}{\sqrt{(\sum x_i^2)(\sum y_i^2)}} \quad (1)$$

The following LaTeX commands have been included as a reference. You will not need to use all of these commands. Note that the basic document structure has been completed for you.

<i>Normal commands</i>	<i>Environments</i>	<i>Math mode commands</i>
<code>\emph{}</code>	<code>itemize</code>	<code>\sum{}{}</code>
<code>\section{}</code>	<code>enumerate</code>	<code>\sum</code>
<code>\subsection{}</code>	<code>verbatim</code>	<code>\frac{}{}</code>
<code>\large</code>	<code>flushright</code>	<code>\sqrt{}</code>
<code>\textbf{}</code>	<code>center</code>	<code>\geq</code>
<code>\title{}</code>	<code>quote</code>	<code>\pi</code>
<code>\author{}</code>	<code>displaymath</code>	<code>\ldots</code>
<code>\date{}</code>	<code>equation</code>	
<code>\maketitle</code>	<code>quotation</code>	<code>^</code>
<code>\item</code>		<code>-</code>


```
\documentclass[a4paper]{article}
\begin{document}

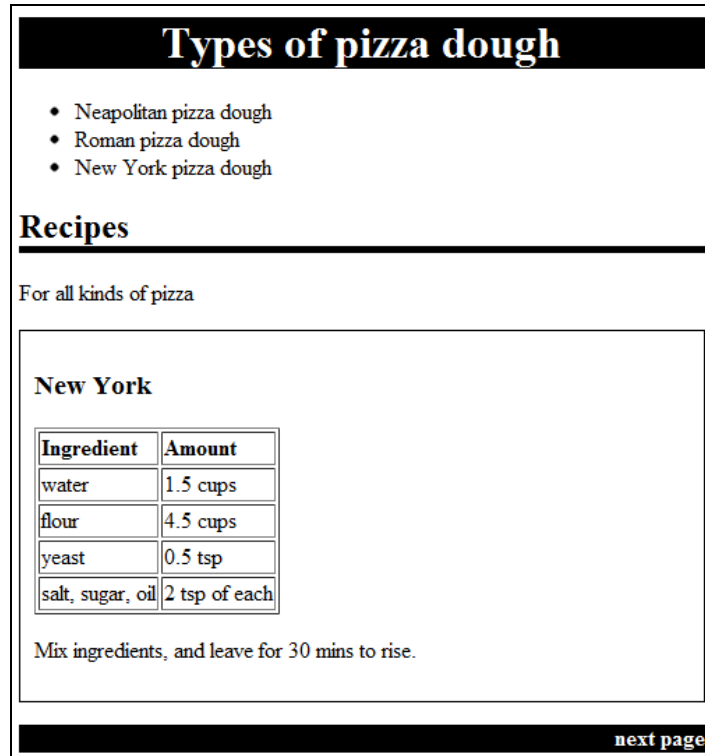
\title{Latex}
\author{Andrew Luxton-Reilly}
\date{September 30, 2010}
\maketitle
\section{Correlations}
Two kinds of correlations are:
\begin{enumerate}
\item Reflective correlation
\item Person's correlation
\end{enumerate}
\subsection{Reflective correlation}
The sample reflective correlation is:
\begin{equation}
rr_{xy} = \frac{\sum x_i y_i}{\sqrt{(\sum x_i^2)(\sum y_i^2)}}
\end{equation}

\end{document}
```

(10 marks)

30. XHTML and CSS (10 marks)

The following screenshot shows a web page created using XHTML 1.0 strict and Cascading Style Sheets:



Complete the XHTML code below so that it produces the output shown above. You **must** use the styles defined in the internal style sheet in the head section below, and **must not** define any new styles.

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">

<head>
<title>Pizza page</title>
<link rel="stylesheet" href="test.css" type="text/css" />
<style type="text/css">

h1 {
  text-align: center;
}
h2 {
  border-bottom-color: black;
  border-bottom-style: solid;
  border-bottom-width: thick;
}
.recipe{
  border-color: black;
  border-style: solid;
  border-width: thin;
```

```

padding: 10px;
}
.invert {
background-color: black;
color: white;
}
.label {
font-weight: bold;
}
#footer {
text-align: right;
font-weight: bold;
}

```

```
</style>
```

```
</head>
```

```
<body>
```

```
<!-- Main heading -->
```

```
<h1 class = "invert">Types of pizza dough</h1>
```

(1 mark)

```
<!-- List of Pizza types -->
```

```

<ul>
  <li>Neapolitan pizza dough</li>
  <li>Roman pizza dough</li>
  <li>New York pizza dough</li>
</ul>

```

(2 marks)

```
<h2>Recipes</h2>
```

```
<p>For all kinds of pizza</p>
```

```
<!-- Recipe top -->
```

```

<div class = "recipe">
  <h3>New York</h3>

```

(1 mark)

```
<!-- Table of ingredients -->
```

```
<table border="1px">
```

```

  <tr class = "label">
    <td>Ingredient</td>
    <td>Amount</td>
  </tr>
  <tr>
    <td>water</td>

```

```
        <td>1.5 cups</td>
    </tr>
    <tr>
        <td>flour</td>
        <td>4.5 cups</td>
    </tr>
    <tr>
        <td>yeast</td>
        <td>0.5 tsp</td>
    </tr>
    <tr>
        <td>salt, sugar, oil</td>
        <td>2 tsp of each</td>
    </tr>
```

(3 marks)

</table>

<!-- Recipe bottom -->

```
    <p>Mix ingredients, and leave for 30 mins to rise.</p>
</div>
```

(1 mark)

<!-- Footer -->

```
<p id = "footer" class = "invert">next page</p>
```

(2 marks)

```
</body>
</html>
```