

THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2014
Campus: City

COMPUTER SCIENCE

An Introduction to Practical Computing

(Time Allowed: ONE hour)

- NOTE:
- Calculators are not permitted.
 - Compare the test version number on the Teleform sheet supplied with the version number above. If they do not match, ask the test supervisor for a new sheet.
 - Enter your name and student ID on the Teleform sheet. Your name and Student Id should both be entered left aligned. If your name is longer than the number of boxes provided, truncate it.
 - Answer Section A (Multiple choice questions) on the Teleform answer sheet provided. Answer Section B in the space provided in this booklet.
 - Use a dark pencil to shade in your answers in the multiple choice answer boxes on the Teleform sheet. Check that the question number on the sheet corresponds to the question number in this question book. If you spoil your sheet, ask the supervisor for a replacement.
 - There is space at the back for answers that overflow the allotted space.

Surname	Sample
Forenames	Solutions
Student ID	
Login (UPI)	

	Question	Mark	Out Of
1 - 30	Multiple Choice		75
31	LaTeX Code		15
32	LaTeX Output		10
	TOTAL		100

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

SECTION A
MULTIPLE CHOICE QUESTIONS

For each question, choose the best answer according to the information presented in lectures. Select your preferred answer on the Teleform answer sheet by shading in the appropriate box.

Question 1

[2.5 marks] What decimal number is equal to the binary number 1110?

- (a) 13
- (b) 22
- (c) **14**
- (d) 28
- (e) 11

Question 2

[2.5 marks] What is the next binary number in the sequence 101, 110, 111?

- (a) 1111
- (b) **1000**
- (c) 1110
- (d) 1001
- (e) 1010

Question 3

[2.5 marks] Which of the following lists goes from largest to smallest?

- (a) 1KiB, 1GiB, 1MB, 1MiB
- (b) 1TiB, 1MB, 1GiB, 1KB
- (c) **1GiB, 1MiB, 1MB, 1KiB**
- (d) 1KiB, 1KB, 1MiB, 1GB
- (e) 1GB, 1MB, 1MiB, 1KiB

Question 4

[2.5 marks] Which piece of computer hardware within a computer carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the system?

- (a) RAM
- (b) SSD
- (c) HDD
- (d) **CPU**
- (e) Motherboard

Question 5

[2.5 marks] What is Wirth's law?

- (a) The number of transistors on a single chip doubles approximately every 2 years.
- (b) The number of transistors on a single chip doubles approximately every 18 months.
- (c) The number of transistors on a single chip doubles approximately every 4 years.
- (d) Hardware is getting slower more rapidly than software becomes faster.
- (e) **Software is getting slower more rapidly than hardware becomes faster.**

Question 6

[2.5 marks] Which of the following statements about Random Access Memory (RAM) is TRUE?

- (a) RAM is the main circuit board for the computer.
- (b) RAM is long term storage for data.
- (c) RAM converts power voltage from AC to DC.
- (d) **Data on RAM is lost when electricity is switched off.**
- (e) RAM converts the internal representation of an image into something that can be displayed using a computer monitor.

Question 7

[2.5 marks] Which of the following does NOT apply to Free Software?

- (a) Freedom to distribute changed works.
- (b) Freedom to change the work.
- (c) **Freedom to stop redistribution of subsequent derivative works by others.**
- (d) Freedom to use and study the work.
- (e) Freedom to copy and share the work with others.

Question 8

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

- (a) Software patent protects the idea itself.
- (b) Software copyright protects the expression of an idea.
- (c) Software patents enable the patent holder to exclusively commercialize an idea for 20 years.
- (d) **Software copyright and software patents are recognized by all countries.**
- (e) Software copyright allows the creator to retain the rights to their creations.

Question 9

[2.5 marks] Which of the following is NOT regarded as low-level software that manages computer hardware resources and provides common services for other computer programs?

- (a) Microsoft Windows
- (b) UNIX
- (c) Macintosh OS
- (d) Linux
- (e) **Microsoft Internet Explorer**

Question 10

[2.5 marks] Which one of the following has the events in the correct chronological order, from earliest to latest?

- (a) **ARPANET created, TCP/IP created, DNS created, WWW created.**
- (b) TCP/IP created, ARPANET created, DNS created, WWW created.
- (c) DNS created, TCP/IP created, WWW created, ARPANET created.
- (d) ARPANET created, Sputnik launched, TCP/IP created, WWW created.
- (e) Sputnik launched, DNS created, TCP/IP created, WWW created.

Question 11

[2.5 marks] Which of the following statements best describes TCP?

- (a) TCP converts an IP address into a human-readable domain name.
- (b) TCP securely compresses messages when sending, and decompresses messages when they arrive at the destination.
- (c) **TCP divides messages into packets, checks that they have arrived safely and recombines the original message.**
- (d) TCP forms a continuous connection from a source machine to a destination machine.
- (e) TCP sends information faster than other protocols but unreliably.

Question 12

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

- (a) **The Internet is an example of a circuit switching network.**
- (b) Packet switching divides the data to be transmitted into packets transmitted through the network independently.
- (c) Circuit switching is centralized and forms a continuous connection.
- (d) Traditional analogue telephone networks are an example of circuit switching networks.
- (e) Packet switching is decentralized and nodes can route data packages efficiently to their destination, avoiding broken/slow nodes on the way.

Question 13

[2.5 marks] When you send an email, why does your SMTP server contact the DNS?

- (a) The SMTP server does not actually contact the DNS.
- (b) The DNS checks that there are no viruses in the emails that you send.
- (c) The DNS is a directory that filters out email addresses that have protected access, and is in the “do not send” list.
- (d) **The DNS is a directory used by SMTP to find the IP address of a specific server.**
- (e) The DNS makes a copy of the email to be archived.

Question 14

[2.5 marks] Which of these protocols is used when a user downloads their mail from a mail server?

- (a) **IMAP**
- (b) SMTP
- (c) UDP
- (d) CERN
- (e) HTTP

Question 15

[2.5 marks] Which of the following systems is asynchronous?

- (a) Real Time Video Conferencing
- (b) IP Telephony
- (c) Real Time Streaming Media
- (d) Instant Messaging
- (e) **SMS Texting**

Question 16

[2.5 marks] Which of these statements about Wikipedia is FALSE?

- (a) Wikipedia is the world's biggest wiki.
- (b) Most pages in Wikipedia can be edited by anyone.
- (c) **Information on Wikipedia is provided by a group of selected experts.**
- (d) Pages which are frequently vandalized within Wikipedia are semi-protected.
- (e) Wikipedia is an online database.

Question 17

[2.5 marks] Which of the following would be the output in the Stage I Wiki for this wiki markup:

''Test'' ?

- (a) Test
- (b) **Test**
- (c) **TEST**
- (d) *Test*
- (e) *Test*

Question 18

[2.5 marks] Which of the following statements about design themes in PowerPoint is FALSE?

- (a) They provide a consistent overall look for all slides in the presentation.
- (b) **They allow the content of the presentation to have a logical flow.**
- (c) They ease the process of designing individual slides.
- (d) They enhance the visual quality of presentations.
- (e) They have a combination of pre-set fonts and backgrounds.

Question 19

[2.5 marks] Which of the following is considered to be a good presentation design practice?

- (a) Using a green font on a red background.
- (b) Using a different background for each slide to make the presentation more interesting.
- (c) Using a font colour that contrasts sharply with the background.**
- (d) Using a different colour for each point in the slide.
- (e) Using capitalized fonts regularly.

Question 20

[2.5 marks] What does HTTP stand for?

- (a) Hypertext Transfer Protocol**
- (b) Harddrive Tebibyte Package
- (c) Harddrive Terabyte Package
- (d) Host Thread Transport Protocol
- (e) Hyper Threading Transitional Port

Question 21

[2.5 marks] The WWW project was started in 1989 by

- (a) Steve Jobs
- (b) Bill Gates
- (c) Tome Jones
- (d) Tim Berners-Lee**
- (e) Ted Nelson

Question 22

[2.5 marks] WolframAlpha is an engine getting knowledge and answers by

- (a) searching specialized websites.
- (b) searching large websites.
- (c) dynamic computation.**
- (d) crawling the WWW.
- (e) searching academic websites.

Question 23

[2.5 marks] The Copyright (Infringement File Sharing) Amendment Act 2011 provides rights owners with a special regime for taking enforcement action against people who

- (a) infringe copyright or use file sharing.
- (b) infringe copyright.
- (c) use file sharing.
- (d) infringe copyright through file sharing.**
- (e) infringe copyright but not through file sharing.

Question 24

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

- (a) Files can be shared via Peer-to-Peer networks.
- (b) A black list prevents access to all harmful websites.**
- (c) Information on the Internet that is legal to view in one country might be illegal to view in another country.
- (d) Black lists and white lists are both forms of blocking software.
- (e) Censorship laws are broken by viewing illegal material or viewing legal material illegally (by young people).

Question 25

[2.5 marks] Filtering software stops access to websites based on

- (a) the language used.
- (b) access time.
- (c) the software used.
- (d) the content.**
- (e) proximity to schools.

Question 26

[2.5 marks] What are the ASCII codes that represent the word CAT?

- (a) 67 67 81
- (b) 67 65 84**
- (c) 84 65 80
- (d) 65 67 84
- (e) 67 77 81

Question 27

[2.5 marks] Which one of the following statements about the use of styles in Microsoft Word is FALSE?

- (a) Once a style has been defined, it cannot be modified.**
- (b) Styles can be used to apply many formatting changes at once.
- (c) Using styles helps to maintain consistency of appearance.
- (d) Users can create their own styles.
- (e) Defining a style is a way of giving a name to a set of formatting changes.

Question 28

[2.5 marks] Dr. Herman Hollerith developed a mechanical punch card device

- (a) to calculate bank interest.
- (b) to calculate tax.
- (c) for mechanical engineering computations.
- (d) for mining computations.
- (e) to tabulate census data.**

Question 29

[2.5 marks] The MITS Altair 8800 was designed in

- (a) 1959
- (b) 1946
- (c) 1955
- (d) 1975**
- (e) 1988

Question 30

[2.5 marks] Currently the dominating operating systems for smartphones are

- (a) Android (Google) and iOS (Apple).**
- (b) Android (Google) and Firefox OS.
- (c) iOS (Apple) and Blackberry 10.
- (d) Firefox OS and iOS (Apple).
- (e) Palm OS and Android (Google).

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.

Question 31 LaTeX Code (15 marks)

On the following page, complete the LaTeX code that will produce the following output:

A discrete random variable X is said to have a Poisson distribution with parameter $\lambda > 0$, if for $k = 0, 1, 2, \dots$ the probability mass function of X is given by:

$$f(x; \lambda) = Pr(X = k) = \frac{\lambda^k e^{-\lambda}}{k!} \quad (1)$$

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>\section{}</code> <code>\subsection{}</code> <code>\large</code> <code>\textbf{}</code> <code>\title{}</code> <code>\author{}</code> <code>\date{}</code> <code>\maketitle</code> <code>\item</code> <code>\noindent</code>	<code>itemize</code> <code>enumerate</code> <code>verbatim</code> <code>flushright</code> <code>center</code> <code>quote</code> <code>displaymath</code> <code>equation</code> <code>quotation</code>	<code>\$</code> <code>\left[</code> <code>\right]</code> <code>\sum_{ }^{ }</code> <code>\frac{ }{ }</code> <code>\sqrt{ }</code> <code>\geq</code> <code>\pi</code> <code>\ldots</code> <code>\lambda</code> <code>^</code> <code>-</code>

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

A discrete random variable X is said to have a Poisson distribution with parameter $\lambda > 0$, if for $k = 0, 1, 2, \dots$ the probability mass function of X is given by:

```
\begin{equation}
```

$$f(x; \lambda) = \Pr(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$$

```
\end{equation}
```

```
\end{document}
```

(15 marks)

Question 32 LaTeX Output (10 marks)

In the space below, draw what would be generated by the following LaTeX code.

```

\documentclass[12pt]{article}
\begin{document}
\section{Sum of Cubes}
\noindent By examining the following four sums:\\
\noindent  $1^3=1$ \\
 $1^3+ 2^3=9$ \\
 $1^3+ 2^3 + 3^3=36$ \\
 $1^3+ 2^3 + 3^3 +4^3=100$ \\
\noindent we can guess that the sum is always square.
More precisely, the sum of the first  $n$  cubes is
\begin{displaymath}
\sum_{k=1}^n k^3 = \left[ \frac{n(n+1)}{2} \right]^2.
\end{displaymath}
\end{document}

```

1 Sum of Cubes

By examining the following four sums:

$$1^3 = 1$$

$$1^3 + 2^3 = 9$$

$$1^3 + 2^3 + 3^3 = 36$$

$$1^3 + 2^3 + 3^3 + 4^3 = 100$$

we can guess that the sum is always square. More precisely, the sum of the first n cubes is

$$\sum_{k=1}^n k^3 = \left[\frac{n(n+1)}{2} \right]^2.$$

(10 marks)