2910110 Introduction to Computing and Internet 2011–2012
Coursework I: Memory and CPU

There are 100 marks available for this assignment.

1. A conventional computer hardware system based on the von Neumann model consists of four subsystems, namely:

   (a) input/output devices
   (b) memory
   (c) control units
   (d) arithmetic logic unit.

   Draw a block diagram for the computer system based on the von Neumann model to summarise the relationship and connections between the four subsystems. You should distinguish (i) the flow of data and program instructions (use solid arrow lines) and (ii) control command and signals (use dashed arrow lines). [32]

2. Conduct a research and discuss whether or not each of the following historical computation machines is a computer according to the von Neumann model. Give your reasons. [28]

   (a) Abacus
   (b) Pascal's machine
   (c) Leibniz's machine
   (d) Babbage's difference engine

3. Explain what a cache is. In general, some partial data tend to be used repeatedly on a computer. Assume that a computer spends 80% time on 20% data stored. Describe and demonstrate how a cache can be used to improve the access efficiency of such a computer. [20]

4. Consider the value of the computer hardware, software and data to an organisation. Discuss which of the three (hardware, software and data) would be more valuable today to an organisation and explain why. You may add assumptions if necessary to help clear your thoughts and to form coherent arguments, or describe a specific case. Provide factual data to support your arguments. [20]

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION FORM

IMPORTANT, PLEASE NOTE:

You must complete this form in full and attach it to the coursework that is to be submitted to the University.

Full name: .....
(as it appears on your Registration Form)

Student number: .....

Unit title: .....

Unit number: .....

Assignment number: .....

DECLARATION

I declare that:

- I understand what is meant by plagiarism.
- I understand the implications of plagiarism.
- This assignment is all my own work and I have acknowledged any use of the published or unpublished works of other people.

Signature ..... Date .....

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION CHECKLIST

Before you submit your coursework to the University, have you:

- ❒ completed the title, unit number and assignment number on the submission form?
- ❒ **signed** and **dated** the Declaration?
- ❒ put your name and student number on every page?
- ❒ put the unit number, unit name and assignment number on every page?
- ❒ used more than one page? If so, have you securely stapled or tied the pages together?
- ❒ used a disk? If so, have you used a separate disk for each assignment? (Note: you should only use a disk if it is explicitly asked for in the assignment).
- ❒ labelled clearly and securely attached any disks?
- ❒ attached all parts of the coursework required (including the submission form)?

If you fail to do these things your coursework may not be accepted.

Please send all coursework to:

The Registration and Learning Resources Office
Room STG13
Stewart House
University of London
32 Russell Square
London WC1B 5DN
United Kingdom

Tel: +44 (0)20 7862 8326
Fax: +44 (0)20 7862 8329

2910110 Introduction to Computing and Internet 2011–2012
Coursework II: Data Representations and Operating Systems

There are 100 marks available for this assignment.

1. Determine the decimal value represented by the bit pattern 1101 0111 in each of the four systems: (i) unsigned notation, (ii) signed magnitude, (iii) excess notation, and (iv) two's complement notation.
   Hints: When converting numbers from one notation to another, you should show all your work, including the following steps whenever applicable: (1) sign, (2) magnitude, or exponent, or true exponent, (3) mantissa, or significant, or true significant, or significant after normalisation, (4) the final result. Add assumptions if necessary. [20]

2. A two's complement operation on a binary bit pattern may consist of two steps:
   (a) copying bits from the right until a 1 is copied
   (b) flipping the rest of bits.

   Experiment to see whether you can get the original number 11001110 back by applying *twice* the two's complement operation. Demonstrate how to get the original number back if you can. [20]

3. Consider the binary bit pattern (1100 1010 0000 0000 0111 0001 0000 1111) (ignore the spaces), which is in the Excess_127 notation, the single precision in IEEE floating-point standards. Explain briefly the Excess_127 notation and indicate the bits for the sign, exponent, mantissa and bias in the table below. Demonstrate how to represent the number in decimal notation by deriving the decimal value of the bit pattern. Show all your work. [20]

	Number of bits	Bits
Memory cell		
Signed		
Exponent		
Mantissa		
Bias		

4. Describe briefly, in own words and diagrams, the roles of the following components, or the principles of the techniques in modern operating systems: [40]
   (a) user interface
   (b) memory manager
   (c) multiprogramming
   (d) demand paging

   You should study thoroughly each of these topics before considering how to describe them concisely.

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION FORM

IMPORTANT, PLEASE NOTE:

You must complete this form in full and attach it to the coursework that is to be submitted to the University.

Full name: .....
(as it appears on your Registration Form)

Student number: .....

Unit title: .....

Unit number: .....

Assignment number: .....

DECLARATION

I declare that:

- I understand what is meant by plagiarism.
- I understand the implications of plagiarism.
- This assignment is all my own work and I have acknowledged any use of the published or unpublished works of other people.

Signature ..... Date .....

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION CHECKLIST

Before you submit your coursework to the University, have you:

- ❒ completed the title, unit number and assignment number on the submission form?
- ❒ **signed** and **dated** the Declaration?
- ❒ put your name and student number on every page?
- ❒ put the unit number, unit name and assignment number on every page?
- ❒ used more than one page? If so, have you securely stapled or tied the pages together?
- ❒ used a disk? If so, have you used a separate disk for each assignment? (Note: you should only use a disk if it is explicitly asked for in the assignment).
- ❒ labelled clearly and securely attached any disks?
- ❒ attached all parts of the coursework required (including the submission form)?

If you fail to do these things your coursework may not be accepted.

Please send all coursework to:

The Registration and Learning Resources Office
Room STG13
Stewart House
University of London
32 Russell Square
London WC1B 5DN
United Kingdom

Tel: +44 (0)20 7862 8326
Fax: +44 (0)20 7862 8329

2910110 Introduction to Computing and Internet 2011–2012
Coursework III: Computer Networks

There are 100 marks available for this assignment.

1. Describe concisely each of the standard network structures below. Draw a topology diagram to show your understanding of each structure, including as many types of the network nodes as possible, for example, (i) Station, (ii) Repeater, (iii) Hub, (iv) Tap, and (v) End Cable. Discuss the advantages and disadvantages for each network structure. [40]

   (a) Star
   (b) Ring
   (c) Mesh
   (d) Bus (backbone or multipoint link)

2. Explain, with a suitable diagram, the use of headers in routing protocols under the TCP/IP model. Give an example where two computers A and B wish to establish a communication. What essential steps do they need to take under the TCP/IP model? Show step by step how headers can be implemented and useful for routing. Add details of assumptions in your discussion if necessary. [30]

3. Consider the class-based IP addressing scheme. Explain how the following network addresses can be used to identify a particular network. Discuss the advantages and disadvantages of the class-based IP addressing. [30]

   (a) 112.32.7.28:80;
   (b) 38.34.2.1:21.

   Your solutions should include all your work, and certain details, further assumptions and related topics if appropriate, such as the binary version of address and mask, boolean AND mask/address, address class or network address, subnet address, host, and application.

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION FORM

IMPORTANT, PLEASE NOTE:

You must complete this form in full and attach it to the coursework that is to be submitted to the University.

Full name: .....
(as it appears on your Registration Form)

Student number: .....

Unit title: .....

Unit number: .....

Assignment number: .....

DECLARATION

I declare that:

- I understand what is meant by plagiarism.
- I understand the implications of plagiarism.
- This assignment is all my own work and I have acknowledged any use of the published or unpublished works of other people.

Signature ..... Date .....

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION CHECKLIST

Before you submit your coursework to the University, have you:

- ❒ completed the title, unit number and assignment number on the submission form?
- ❒ **signed** and **dated** the Declaration?
- ❒ put your name and student number on every page?
- ❒ put the unit number, unit name and assignment number on every page?
- ❒ used more than one page? If so, have you securely stapled or tied the pages together?
- ❒ used a disk? If so, have you used a separate disk for each assignment? (Note: you should only use a disk if it is explicitly asked for in the assignment).
- ❒ labelled clearly and securely attached any disks?
- ❒ attached all parts of the coursework required (including the submission form)?

If you fail to do these things your coursework may not be accepted.

Please send all coursework to:

The Registration and Learning Resources Office
Room STG13
Stewart House
University of London
32 Russell Square
London WC1B 5DN
United Kingdom

Tel: +44 (0)20 7862 8326
Fax: +44 (0)20 7862 8329

2910110 Introduction to Computing and Internet 2011–2012
Coursework IV: The World Wide Web and Legal Framework

There are 100 marks available for this assignment.

1. Write a short essay up to 1500 words on comparative studies of current policies on academic plagiarism. Academic Plagiarism is a serious offence. What are your experience, knowledge and views about the seriousness of the offence? What are the legal rights of the original authors and the plagiarists? What would constitute a good policy on plagiarism in your opinion?
   Conduct research on and compare the policies on academic plagiarism in three academic journals in Computing. Focus on one aspect of the many issues on academic plagiarism. For example, you may focus on how well each of the policies protects the copyrights of the original authors, or how effectively the policies punish the plagiarists, or on the differences in approach or ambiguousness of the policies.
   Good conclusions can only be drawn based on facts. You should therefore pay attention to adequate details of factual data, and make sure that you present sufficient factual data in your essay. You should also use tables, figures and quotations to support your arguments, and include correct references. [50]

2. Evaluate *three* existing webpages about academic plagiarism issues and rank them according to your view on the importance of the issues addressed. Discuss in your opinion the best feature and the worst feature of each of the webpages. Finally, summarise your views in a similar table as follows: [10]

Plagiarism issues	Name of the webpage	URL	Best feature	Worst feature
issue x				
issue y				
issue z				

3. Study the webpage in the first row of the table in question 2 above. Design and develop a better version of the webpage to address *ONE* aspect of the plagiarism issues that you think has been overlooked in the existing webpage. Here the word "better" may be subjective but should be explicitly specified to address the weakness identified in question 2.
   Your need to demonstrate how the particular weakness of the existing webpage may be overcome. You may add assumptions if necessary to simplify your tasks or to support your arguments. More attention should be paid to the functionalities than to the user interface of the webpage.
   Your submission of the webpage design should include the following sections for assessment purposes:
   (a) A flowchart to explain your algorithms or a diagram to explain your coding [10]
   (b) Up to 5 screen shots with specifications of the web page viewer, for example, Internet Explorer, to compare your webpage and the existing webpage. [10]
   (c) A detailed description to explain the techniques that you have applied to make the web page work [10]
   (d) A brief self-evaluation to the web page that you have developed and a list of techniques that you have learnt from this coursework. [10]

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION FORM

IMPORTANT, PLEASE NOTE:

You must complete this form in full and attach it to the coursework that is to be submitted to the University.

Full name: .....
(as it appears on your Registration Form)

Student number: .....

Unit title: .....

Unit number: .....

Assignment number: .....

DECLARATION

I declare that:

- I understand what is meant by plagiarism.
- I understand the implications of plagiarism.
- This assignment is all my own work and I have acknowledged any use of the published or unpublished works of other people.

Signature ..... Date .....

UNIVERSITY OF LONDON

DIPLOMA AND BSc IN COMPUTING AND RELATED SUBJECTS
FOR INTERNATIONAL PROGRAMMES STUDENTS

COURSEWORK SUBMISSION CHECKLIST

Before you submit your coursework to the University, have you:

- ❒ completed the title, unit number and assignment number on the submission form?
- ❒ **signed** and **dated** the Declaration?
- ❒ put your name and student number on every page?
- ❒ put the unit number, unit name and assignment number on every page?
- ❒ used more than one page? If so, have you securely stapled or tied the pages together?
- ❒ used a disk? If so, have you used a separate disk for each assignment? (Note: you should only use a disk if it is explicitly asked for in the assignment).
- ❒ labelled clearly and securely attached any disks?
- ❒ attached all parts of the coursework required (including the submission form)?

If you fail to do these things your coursework may not be accepted.

Please send all coursework to:

The Registration and Learning Resources Office
Room STG13
Stewart House
University of London
32 Russell Square
London WC1B 5DN
United Kingdom

Tel: +44 (0)20 7862 8326
Fax: +44 (0)20 7862 8329