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# Coursework commentary

## 2018–2019

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### CO1110 Introduction to computing and the internet

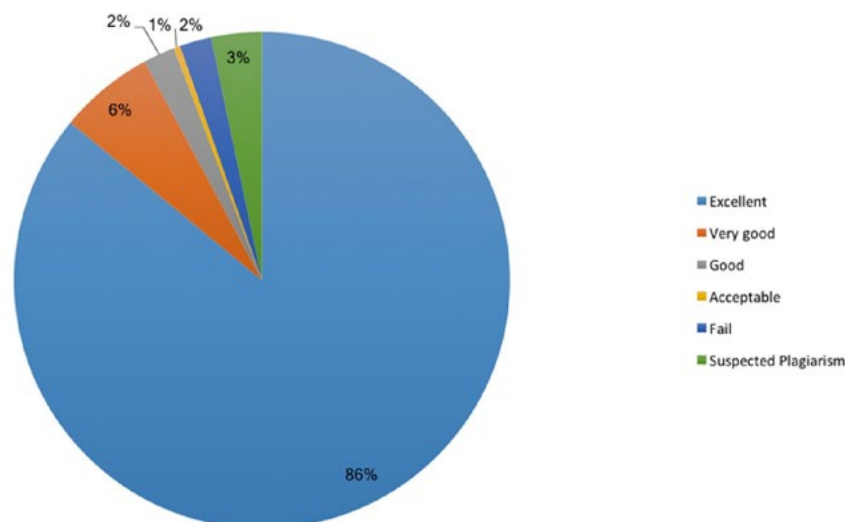
#### Coursework assignment 2

##### General remarks

This Coursework assignment was attempted well by most students. Where students did lose marks, it was often because answers lacked detail and needed further explanation.

See 2018-2019 cohort mark distribution below:

CO1110 CW2 Cohort mark distribution 2018-19



##### Comments on specific questions

###### Question 1

Students were asked to explain how the Selective Acknowledgement scheme addresses a possible inefficiency in the TCP protocol's cumulative acknowledgement scheme.

###### Solution

Assume a situation where the receiver has received packet  $x-1$ , followed by packets  $x+1$ ,  $x+2$ , followed by many other in-order packets. The receiver cannot signal to the sender that while it has not received packet  $x$ , it has received packet  $x+1$ , followed by a great many other in-order packets. If the sender follows the accepted standard and retransmits only the first unacknowledged segment, it must wait for the acknowledgement before it can decide what and how much to resend. Thus, retransmission reverts to a send-and-wait paradigm. Alternatively, the sender can send again all packets starting with packet  $x$ , even though many of them have already been successfully received. This is a potentially large overhead.

SACK allows a receiver to send information back to the sender about any gaps in bytes received. The scheme is not mandatory and does not replace cumulative acknowledgement. Senders indicate in the TCP header that SACK is possible while making the connection. This scheme allows the sender to retransmit only missing data. For example, if a receiver had bytes 1-10 and 15-18, it could indicate that it was waiting for segments with sequence numbers including 11 and 19. It would do this by including the starting sequence number of each contiguous block (in this case 1 and 15) and the sequence number following on from the last sequence number in the block (in this case 11 and 19). Hence, in the above example, when sending an ACK, the receiver would include 1 and 11 for the first block, plus 15 and 19 for the second.

### Comments

Some very good answers were seen, with most students who attempted the question receiving most or all of the credit for it. Where students lost marks it was often because of a lack of detail and/or clarity. In some cases students could have improved the clarity of their answers by giving an example of how SACK might be applied.

### Question 2

- a. Students were asked to complete a table of subnet masks for class C addresses.

Subnet mask	Subnet mask in binary	Number of subnets	Number of hosts
255.255.255.0	11111111 11111111 11111111 00000000	$2^0 = 1$	$2^8 - 2 = 254$
255.255.255.128	11111111 11111111 11111111 10000000	$2^1 = 2$	
255.255.255.255			

**Solution**

Subnet masks for class C addresses

Subnet mask	Subnet mask in binary	Number of subnets	Number of hosts
255.255.255.0	11111111 11111111 11111111 00000000	$2^0 = 1$	$2^8 - 2 = 254$
255.255.255.128	11111111 11111111 11111111 10000000	$2^1 = 2$	$2^7 - 2 = 126$
255.255.255.192	11111111 11111111 11111111 11000000	$2^2 = 4$	$2^6 - 2 = 62$
255.255.255.224	11111111 11111111 11111111 11100000	$2^3 = 8$	$2^5 - 2 = 30$
255.255.255.240	11111111 11111111 11111111 11110000	$2^4 = 16$	$2^4 - 2 = 14$
255.255.255.248	11111111 11111111 11111111 11111000	$2^5 = 32$	$2^3 - 2 = 6$
255.255.255.252	11111111 11111111 11111111 11111100	$2^6 = 64$	$2^2 - 2 = 2$
255.255.255.254	11111111 11111111 11111111 11111110	$2^7 = 128$	$2^1 - 2 = 0$
255.255.255.255	11111111 11111111 11111111 11111111	$2^8 = 256$	$2^0 - 2 = -1$

b. Students were asked to identify the usable subnet masks in the table.

**Solution**

The first mask 255.255.255.0 gives the entire network, so is not a sensible subnet. The final two subnet masks are clearly unusable, as they do not give any possible hosts. This gives six usable subnet masks, although the subnet mask 255.255.255.252 is unlikely to be used in practice, as it gives 64 subnets, each with only two hosts.

c. Students were asked to explain why, in the table given in part (a), two is deducted from the possible number of hosts, to give the actual number of host addresses.

**Solution**

Two is subtracted from the number of hosts because the all zeros host address is the same as the subnet address, so cannot be used, and the all ones subnet address is the broadcast address for that subnet, so it is not used as a host address.

d. Students were asked to give the CIDR notation for an IP address of 201.168.67.0 with the subnet mask 255.255.255.128.

**Solution**

201.168.67.0/25

**Comments**

This question was answered well, with very good answers seen. Most students correctly answered parts (a), (c) and (d). Quite a number of students found part (b) to be the most challenging, with some not attempting that part of the question.

**Question 3**

- a. Students were given the file JokesCWK2-2018-19.html and asked some questions about it.

**Solution****External style sheet:**

```
<link rel="stylesheet" href="blueHeadings.css">
```

**Document level:**

```
<style>
    h2{color: red;}
</style>
```

**Inline:** Any one of:

```
<h2 style="color:red;">Lightbulb joke</h2>
<h2 style="color:orange;">Knock knock joke</h2>
<h2 style="color:yellow;">Pun</h2>
```

- b. Students were asked about precedence in CSS styling.

**Solution**

The different ways of adding presentation have precedence levels as follows:

- highest precedence – inline styles
- next highest – document level
- lowest – external style sheet.

This means that any inline styles will always be implemented. Following this document level styles will be implemented, but only when they will not overwrite inline styles. External style sheets have the lowest precedence, meaning that their styles will be implemented unless there is a clash with inline or document level styles.

**Comments**

Most students answered part (a) correctly, but many gave the wrong precedence order for part (b), thinking that external style sheets had the highest precedence.

External style sheets have the lowest precedence, and this can seem counterintuitive, but it allows developers to have fine-grained control over the look of their web pages. Typically, an external style sheet will do most of the work for a website, but if the developer wants a particular page, or just one particular element, to have a different style, document or inline styles give the developer that option. If external style sheets had the highest level of precedence, then combining the three different ways of implementing CSS would be difficult, as the external style sheet would override everything. For example, suppose a developer wanted one paragraph to be in a different font to the others, s/he would have to leave paragraph styling out of the external style sheet, and apply paragraph styles at the document and inline level for all pages. However external style sheets have the lowest precedence precisely so that developers can have the fine-grained control that they want.

#### **Question 4**

Students were asked to discuss whether or not software patents are a good idea in terms of encouraging innovation and stimulating business.

#### **Comments**

This question did not have a right or wrong answer. Students were expected to do some research and reading on the subject, taking in different view points. A good answer would consider arguments for and against and come to a conclusion citing supporting evidence. Marks were awarded for sensible, relevant points, coherent argumentation, supporting evidence given with references, depth of knowledge demonstrated, and clarity.

On the whole, the question was answered well. Some students could have improved their mark by referencing more evidence for the arguments they were putting forward. Others could have improved their mark with more in-depth discussion of the issues, as a few answers were rather superficial.