Department of Computing Science and Mathematics
University of Stirling

CSCU9V4 Systems I - Tutorial 1

Week beginning 5th February 2018

1. The following is a 32-bit binary number.

01000001010000100100001101000100

Write it in hexadecimal.

What might it signify when stored in a computer? (How many different possible meanings can you think of?) Is there any way of telling what its intended meaning is?

2. Showing all workings, convert the following decimal numbers first to binary, and then to hexadecimal:

1, 2, 4, 8, 32, 128, 256, 7, 10, 100, 127, 255, 65535

Would it have been easier to convert them to hexadecimal first and then to binary?

Convert the following four 8-bit binary numbers into decimal, and also into hexadecimal: (the grouping of the numbers into nibbles is just to make it easier to read, and doesn't affect the interpretation):

0000 1000
0000 1011
0101 0101
1010 1010

Would it have been easier to convert them to hexadecimal first, then to decimal?

Convert the following hexadecimal numbers to decimal, and also to binary:

08x	09x	10x	30x
40x	0Ax	A0x	CFx

3. An (old) HTML file for a web page contains the following tag (to give colours for the main body of the web page):

```
<BODY BGCOLOR="#ffffff" TEXT="#000000" LINK="#cc00cc"
VLINK="#900090">
```

What colour

- is the background of the web page?
- is the text on the web page?
- are the links on the web page?
- do the links turn to once they have been visited (the VLINK attribute)?

4. What is the range of numbers that can be represented by a 16 bit word:

- As a pure non-negative integer
- As a 2's complement integer
- If it is divided up into 4 bit nibbles, and each is used to hold a decimal digit between 0 and 9
- If it is divided up into 4 bit nibbles, and each is used to hold a hexadecimal digit between 0 and F
- If it is divided as above, and the first 4 bit nibble is used to store a sign (+/-), and the other three to store a digit.

5. The hexadecimal below represents a string in a programming language (not Java) which uses ASCII notation.

What text does the string have in it?
417072696C2073686F7765727320676F206F6E20666F7220686F7572732100x

Using ASCII, convert the following message into hexadecimal notation:
In July the sun is hot. Is it shining? No it's not!

What would the string look like if it was (i) null-terminated (= NUL terminated), (ii) counted? What problem might one have with a long counted string?

Table of ASCII Characters

	(less significant 4 bits)														
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	DEL