Question 1

Consider the decimal and binary equivalents of these numbers:

$111 \rightarrow 01101111$	$-111 \rightarrow 10010001$
$113 \rightarrow 01110001$	$-113 \rightarrow 10001111$

1. Perform the addition $(-113) + (+111)$ in 8-bit two's-complement.

2. Perform the addition $(+113) + (-111)$ in 8-bit two's-complement.

3. Perform the addition $(+113) + (+111)$ in 8-bit two's-complement.

4. Perform the addition $(-113) + (-111)$ in 8-bit two's-complement.

Question 2

Give the ranges of integers created by these `range` functions:

1. `range(6)`:

2. `range(-4)`:

3. `range(1,6)`:

4. `range(1,11,2)`:

5. `range(11,1,-2)`:

Question 3

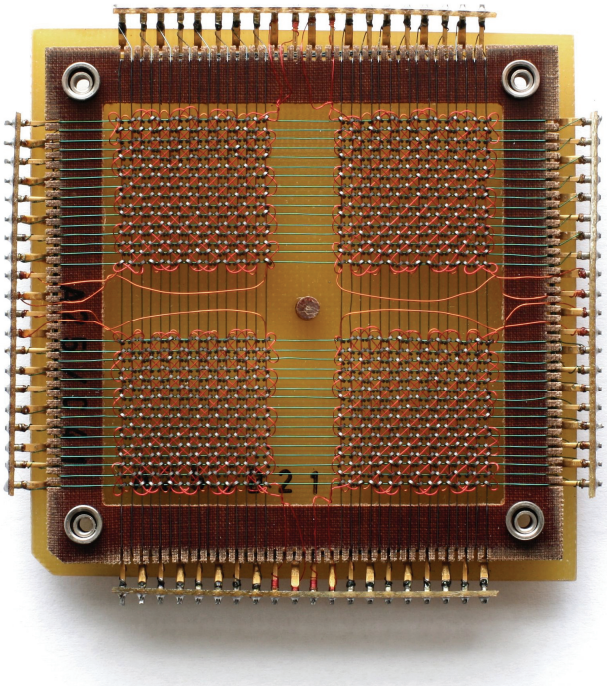
Consider the following magnetic core memory device. As we have learned, each core represents one bit of information, depending on the magnetization direction of the ring (clockwise vs counterclockwise), thus, this memory device has 1024 bits,

1. How many **bytes** of memory does this device have?

2. How many **words** of memory does this device have if the wordsize is 16 bits?

3. How many **words** of memory does this device have if the wordsize is 32 bits?

4. How many **words** of memory does this device have if the wordsize is 64 bits?



Question 4

Consider the following text file which contains 2 lines.

```
The old believe everything;
the young know everything.
```

1. How many bytes does this file occupy on computer?

2. Write the US-ASCII representation of the text Note: The end-of-line character in US-ASCII is `0A`.

US ASCII Table

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	00	Null	32	20	Space	64	40	@	96	60	`
1	01	Start of heading	33	21	!	65	41	A	97	61	a
2	02	Start of text	34	22	"	66	42	B	98	62	b
3	03	End of text	35	23	#	67	43	C	99	63	c
4	04	End of transmit	36	24	$	68	44	D	100	64	d
5	05	Enquiry	37	25	%	69	45	E	101	65	e
6	06	Acknowledge	38	26	&	70	46	F	102	66	f
7	07	Audible bell	39	27	'	71	47	G	103	67	g
8	08	Backspace	40	28	(	72	48	H	104	68	h
9	09	Horizontal tab	41	29	)	73	49	I	105	69	i
10	0A	Line feed	42	2A	*	74	4A	J	106	6A	j
11	0B	Vertical tab	43	2B	+	75	4B	K	107	6B	k
12	0C	Form feed	44	2C	,	76	4C	L	108	6C	l
13	0D	Carriage return	45	2D	-	77	4D	M	109	6D	m
14	0E	Shift out	46	2E	.	78	4E	N	110	6E	n
15	0F	Shift in	47	2F	/	79	4F	O	111	6F	o
16	10	Data link escape	48	30	0	80	50	P	112	70	p
17	11	Device control 1	49	31	1	81	51	Q	113	71	q
18	12	Device control 2	50	32	2	82	52	R	114	72	r
19	13	Device control 3	51	33	3	83	53	S	115	73	s
20	14	Device control 4	52	34	4	84	54	T	116	74	t
21	15	Neg. acknowledge	53	35	5	85	55	U	117	75	u
22	16	Synchronous idle	54	36	6	86	56	V	118	76	v
23	17	End trans. block	55	37	7	87	57	W	119	77	w
24	18	Cancel	56	38	8	88	58	X	120	78	x
25	19	End of medium	57	39	9	89	59	Y	121	79	y
26	1A	Substitution	58	3A	:	90	5A	Z	122	7A	z
27	1B	Escape	59	3B	;	91	5B	[	123	7B	{
28	1C	File separator	60	3C	<	92	5C	\	124	7C	|
29	1D	Group separator	61	3D	=	93	5D	]	125	7D	}
30	1E	Record separator	62	3E	>	94	5E	^	126	7E	~
31	1F	Unit separator	63	3F	?	95	5F	_	127	7F	□

Question 5

Consider the following code fragmentations involving the turtle module. The turtle object `alice` is already created, and it sits in the center of the window. Draw its path as the code executes:

```
for i in range(6):
    alice.forward(100)
    alice.left(60)
```

➤

```
for i in range(6):
    alice.forward(100)
    alice.left(45*i)
```

➤

```
for i in range(10):
    alice.forward(100+10*i)
    alice.left(90)
```

➤

```
for i in range(5):
    alice.forward(100)
    alice.left(144)
```

➤