

CS 103000

Prof. Madeline Blount

Week 2: VARIABLES +
BINARY

ATTENDANCE:

<https://cs103-proton.glitch.me/>



Dall-E 2: cats learning C++ in the forest on '90's technology



<https://cs103-proton.glitch.me/> EARTHSEA



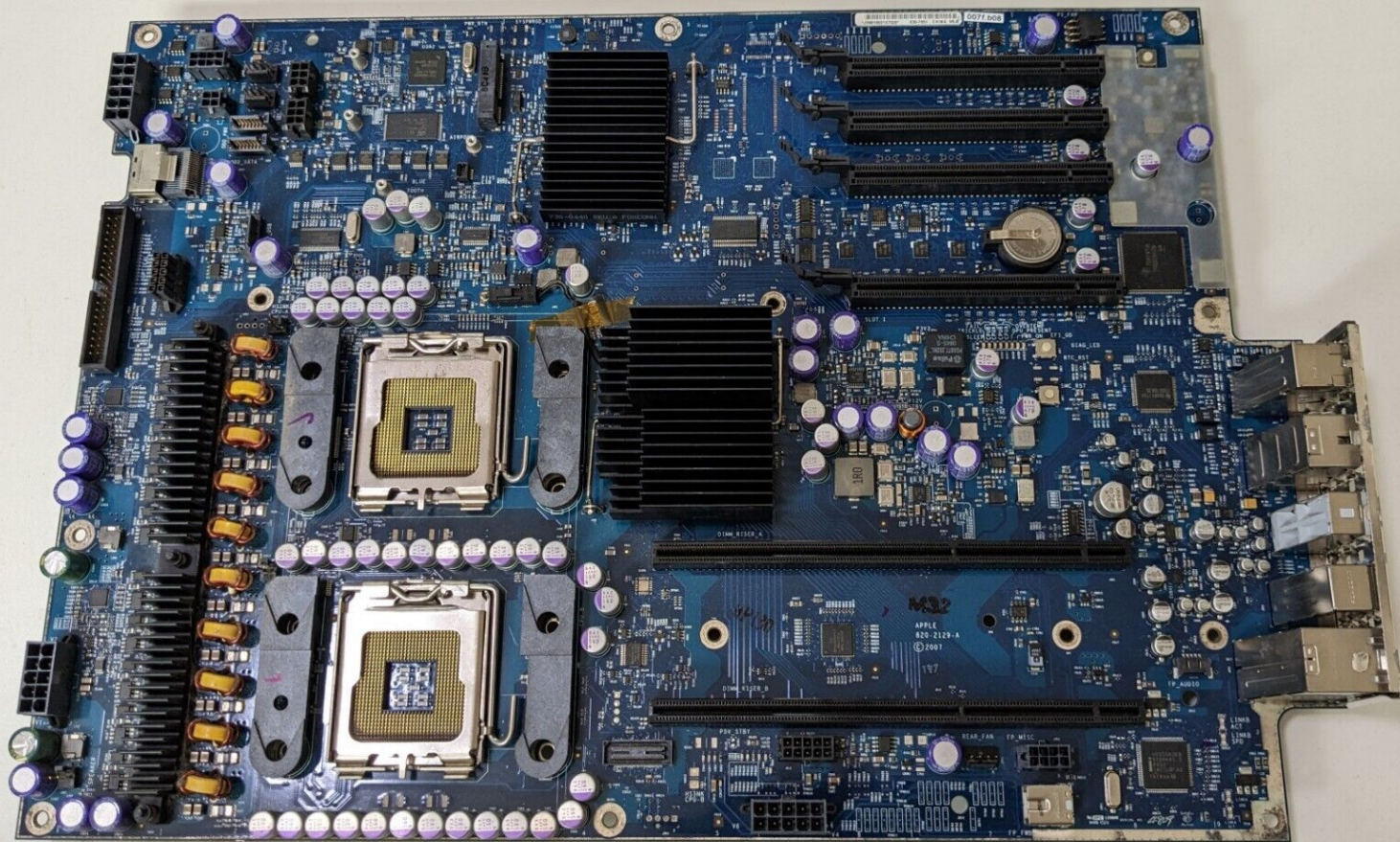
“For magic consists in this,
the true naming of a thing.”

— Ursula K. LeGuin, *A Wizard of Earthsea*

```
int score = 0;
```

declaration

initialization



Data Type	Memory Size
bool	1 byte
char	1 byte
int	4 bytes
float	4 bytes
double	8 bytes
std::string	24 bytes



INTEGER OVERFLOW: weirdness, limitations



we don't have infinite memory!

int = 32 bits (4 bytes)

000000000000000000000000000000000000

111111111111111111111111111111111111

4,294,967,295

+/- 2,147,483,647

Data Type	Memory Size
<code>bool</code>	1 byte
<code>char</code>	1 byte
<code>int</code>	4 bytes
<code>float</code>	4 bytes
<code>double</code>	8 bytes
<code>std::string</code>	24 bytes



ASCII =
American
Standard
Code for
Information
Interchange
(1963)

1000011 1100001 1110100 0100001

67	97	116	33
C	a	t	!

Binary	Dec	Char	Binary	Dec	Char	Binary	Dec	Char
010 0000	32	space	100 0000	64	@	110 0000	96	`
010 0001	33	!	100 0001	65	A	110 0001	97	a
010 0010	34	"	100 0010	66	B	110 0010	98	b
010 0011	35	#	100 0011	67	C	110 0011	99	c
010 0100	36	\$	100 0100	68	D	110 0100	100	d
010 0101	37	%	100 0101	69	E	110 0101	101	e
010 0110	38	&	100 0110	70	F	110 0110	102	f
010 0111	39	'	100 0111	71	G	110 0111	103	g
010 1000	40	(100 1000	72	H	110 1000	104	h
010 1001	41)	100 1001	73	I	110 1001	105	i
010 1010	42	*	100 1010	74	J	110 1010	106	j
010 1011	43	+	100 1011	75	K	110 1011	107	k
010 1100	44	,	100 1100	76	L	110 1100	108	l
010 1101	45	-	100 1101	77	M	110 1101	109	m
010 1110	46	.	100 1110	78	N	110 1110	110	n
010 1111	47	/	100 1111	79	O	110 1111	111	o
011 0000	48	0	101 0000	80	P	111 0000	112	p
011 0001	49	1	101 0001	81	Q	111 0001	113	q
011 0010	50	2	101 0010	82	R	111 0010	114	r
011 0011	51	3	101 0011	83	S	111 0011	115	s
011 0100	52	4	101 0100	84	T	111 0100	116	t
011 0101	53	5	101 0101	85	U	111 0101	117	u

Unicode Consortium

(more bits, up to 32 -
many more characters)



jellyfish

Unicode: U+1FABC,
"\U0001FABC"

UTF-8: F0 9F AA BC



0 0 0 1 0 1 1 1

1 0 0 1 0 0 0 1