

- Today:
- Pointers and arrays
 - Reserving memory on the fly (i.e. dynamically)

Computer Programming 143 – Lecture 20

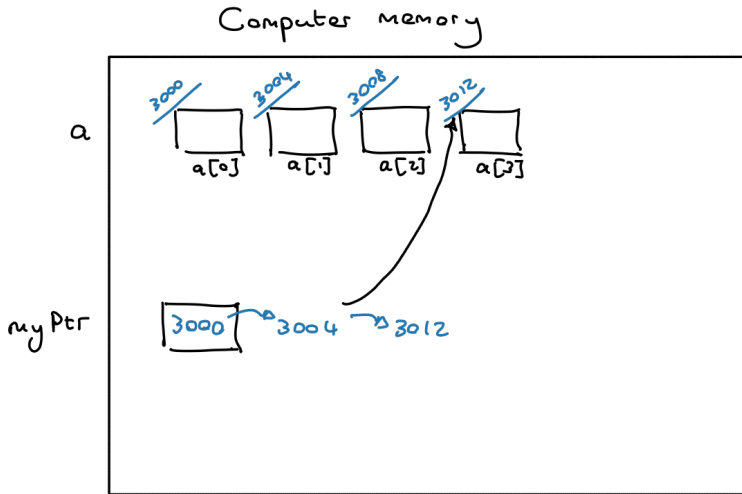
Pointers IV

Faculty of Engineering



Arrays and pointers: Arrays are pointers

```
int a[4];  
int *myPtr;  
myPtr = &a[0];  
myPtr++;  
myPtr = myPtr + 2;
```



7.8 Pointer Expressions (cont...)

Subtracting pointers

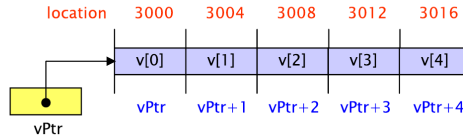
- Returns number of elements from one to the other.

```
int v[5], *vPtr0, *vPtr2; /* correct multi-pointer declaration */  
vPtr0 = &v[0];  
vPtr2 = &v[2];
```

$vPtr2 - vPtr0$ would produce 2

Pointer comparison ($<$, $==$, $>$)

- See which pointer points to the earlier/later numbered array element
- $(vPtr+1) > vPtr$ will return true
- Also, see if a pointer points to nothing (NULL or 0)



7.8 Pointer expressions (cont...)

Pointers of the same type can be assigned to each other

- If not the same type, a cast operator must be used

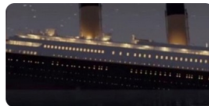
```
int *vPtr0;  
char *vPtr2;  
vPtr2 = (char*)vPtr0;
```

- Exception: pointer to void (**type** void *)
 - Generic pointer, represents any type
 - No casting needed to convert a pointer to void pointer
 - void pointers cannot be dereferenced



Titanic - Machine Learning from Disaster

Start here! Predict survival on the Titanic and get familiar with ML basics



Overview Data Code Models Discussion Leaderboard Rules

Overview



This competition runs indefinitely with a rolling leaderboard. [Learn more](#)

Competition Host

Kaggle



Prizes & Awards

Knowledge

Does not award Points or Medals

Participation

1,471,319 Entrants

9,950 Participants

9,928 Teams

37,103 Submissions

Description



Ahoy, welcome to Kaggle! You're in the right place.

This is the legendary Titanic ML competition – the best, first challenge for you to dive into ML competitions and familiarize yourself with how the Kaggle platform works.

If you want to talk with other users about this competition, come join our Discord!

We've got channels for competitions, job postings and career discussions, resources, and socializing with your fellow data scientists. Follow the link here:

<https://discord.gg/kaggle>

Tags

Binary Classification

Tabular

Beginner

Categorization Accuracy

	A	B	C	D	E	F	G	H	I	J	K	L
1	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
2	1	0	3	Braund, Mr. Owen Harris	male	22	1	0	A/5 21171	7.25		S
3	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Thayer)	female	38	1	0	PC 17599	71.2833	C85	C
4	3	1	3	Heikkinen, Miss. Laina	female	26	0	0	STON/O2. 3101282	7.925		S
5	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35	1	0	113803	53.1	C123	S
6	5	0	3	Allen, Mr. William Henry	male	35	0	0	373450	8.05		S
7	6	0	3	Moran, Mr. James	male		0	0	330877	8.4583		Q
8	7	0	1	McCarthy, Mr. Timothy J	male	54	0	0	17463	51.8625	E46	S
9	8	0	3	Palsson, Master. Gosta Leonard	male	2	3	1	349909	21.075		S
10	9	1	3	Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)	female	27	0	2	347742	11.1333		S
11	10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14	1	0	237736	30.0708		C
12	11	1	3	Sandstrom, Miss. Marguerite Rut	female	4	1	1	PP 9549	16.7	G6	S
13	12	1	1	Bonnell, Miss. Elizabeth	female	58	0	0	113783	26.55	C103	S
14	13	0	3	Saunders, Mr. William Henry	male	20	0	0	A/5. 2151	8.05		S
15	14	0	3	Andersson, Mr. Anders Johan	male	39	1	5	347082	31.275		S
16	15	0	3	Vestrom, Miss. Hulda Amanda Adolfina	female	14	0	0	350406	7.8542		S
17	16	1	2	Hewlett, Mrs. (Mary D Kingcome)	female	55	0	0	248706	16		S
18	17	0	3	Rice, Master. Eugene	male	2	4	1	382652	29.125		Q
19	18	1	2	Williams, Mr. Charles Eugene	male		0	0	244373	13		S
20	19	0	3	Vander Planke, Mrs. Julius (Emelia Maria Vandemoortele)	female	31	1	0	345763	18		S
21	20	1	3	Masselmani, Mrs. Fatima	female		0	0	2649	7.225		C
22	21	0	2	Fynney, Mr. Joseph J	male	35	0	0	239865	26		S
23	22	1	2	Beesley, Mr. Lawrence	male	34	0	0	248698	13	D56	S
24	23	1	3	McGowan, Miss. Anna "Annie"	female	15	0	0	330923	8.0292		Q
25	24	1	1	Sloper, Mr. William Thompson	male	28	0	0	113788	35.5	A6	S
26	25	0	3	Palsson, Miss. Torborg Danira	female	8	3	1	349909	21.075		S
27	26	1	3	Asplund, Mrs. Carl Oscar (Selma Augusta Emilia Johanna)	female	38	1	5	347077	31.3875		S
28	27	0	3	Emir, Mr. Farred Chehab	male		0	0	2631	7.225		C
29	28	0	1	Fortune, Mr. Charles Alexander	male	19	3	2	19950	263	C23 C25	S
30	29	1	3	O'Dwyer, Miss. Ellen "Nellie"	female		0	0	330959	7.8792		Q

12.3 Dynamic memory allocation I

malloc()

- Contained in `stdlib.h`
- Allocates memory during execution time

```
newPtr = malloc( numberOfElements * sizeof( int ) );
```

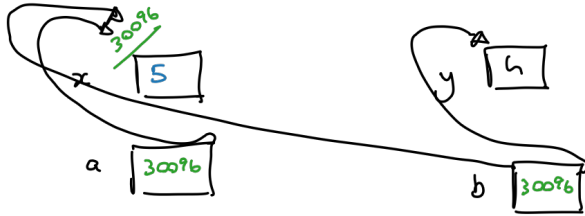
- Allocates memory for an array with `numberOfElements` number of `int` elements
- Starting address of memory block is stored in `newPtr`

free()

- Contained in `stdlib.h`
- Frees memory allocated previously
- Always free dynamically allocated memory to prevent memory leaks

```
int x = 5;  
int *a = &x;  
printf ("%d", *a);
```

```
char y = 'h';  
char *b = &y;  
printf ("%c", *b);  
b = a;  
printf ("%c", *b);
```



C
S
Q

