User Defined Type I
Struct

CIS 308

Jorge Valenzuela

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C Programming Language

Key Words in C Language

auto	double	int	struct
break	else	long	switch
case	enum	register	typedef
char	extern	return	union
continue	for	signed	void
do	if	static	while
default	goto	sizeof	volatile
const	float	short	unsigned

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Struct

- Declaration

```
struct name {
   type1 name1;
   type2 name2;
   ...
} objList;
```

- Example

```
struct person{
    char name[20];
    int age;
} p1, p2;
```

Variables

- Variables

```
struct person p3;
```

type

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Struct

- *Accessing Struct Fields*

```
struct person bobPerson;
bobPerson.age
bobPerson.name
```


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Struct

- *Accessing `struct` Fields*

```
struct person bobPerson;
bobPerson.age = 20;
bobPerson.name
```


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Struct

- *Accessing Struct Fields*

```
struct person bobPerson;
bobPerson.age = 20;
strcpy(bobPerson.name, "Bob");
```


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Struct

- *Accessing Struct Fields*

```
struct person bobPerson;
bobPerson.age = 20;
strcpy(bobPerson.name, "Bob");


bobPerson.name = "Bob";
```


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Struct

- *Accessing Struct Fields*

```
struct person bobPerson;
bobPerson.age = 20;
strcpy(bobPerson.name, "Bob");


bobPerson.name = "Bob"; // Won't compile
```


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Struct

```
#include <stdio.h>
struct point {
  int x;
  int y;
}; //No variables declared here
double getSlope(int, int, int, int);
double getIntercept(int, int, double);

int main() {
…
  slope = getSlope(p1.x, p1.y, p2.x, p2.y);
  intercept = getIntercept(p1.x, p1.y, slope);
…
return 0;
}
```


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Struct

```
#include <stdio.h>
struct point {
  int x;
  int y;
}; //No variables declared here
double getSlope(int  int  int  int ;
double getIntercept int  int  double ;

int main() {
…
  slope = getSlope(p1.x, p1.y, p2.x, p2.y);
  intercept = getIntercept(p1.x, p1.y, slope);
…
return 0;
}
```


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Struct

```
#include <stdio.h>
struct point {
  int x;
  int y;
}; //No variables declared here
double getSlope(struct point, struct point);
double getIntercept(struct point, double);

int main() {
…
  slope = getSlope(p1, p2);
  intercept = getIntercept(p1, slope);
…
return 0;
}
```


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Struct

```
type name[size]

struct person{
   char name[20];
   int age;
};


struct person group[3];

strcpy(group[0].name, "Tom");
group[0].age = 20;
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;

struct person p1;
strcpy(p1.nmae, Tom);
p1.age = 20;
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;

struct person p1;
strcpy(p1.nmae, Tom);
p1.age = 20;

personPtr = &p1;
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;

personPtr = malloc(sizeof(struct person));
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;

personPtr = malloc(sizeof(struct person))

(*personPtr).age = 18;
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;

(*personPtr).age = 18

*personPtr.age = 18; // BAD!
```


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Struct

```
type* name;

struct person{
   char name[20];
   int age;
};


struct person *personPtr;

(*personPtr).age = 18;
```

→ `personPtr->age = 18;`

Preferred way

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Struct

```
struct node{
   char data[30];
   struct node *next; // pointer to the next node
};


struct node *head;
head = malloc(sizeof(struct node));
```

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Struct

```
struct node{
   int data;
   struct node *next; // pointer to the next node
};

struct node *head;
head = malloc(sizeof(struct node);

head->data = 7;
head->next = NULL;
```

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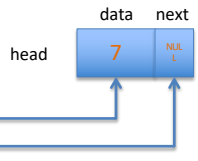
Struct

```
struct node{
   int data;
   struct node *next; // pointer to the next node
};

struct node *head;
head = malloc(sizeof(struct node);

head->data = 7;
head->next = NULL;
```



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Struct

```
struct node{
   int data;
   struct node *next; // pointer to the next node
};
```

```
struct node *head;
head = malloc(sizeof(structnode);

head->data = 7;
head->next = NULL;

struct node *newNode;
newNode= malloc(sizeof(struct node);
```

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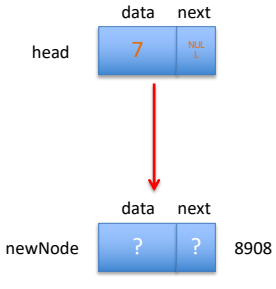
Struct

```
struct node{
   int data;
   struct node *next; // pointer to the next node
};
```

```
struct node *head;
head = malloc(sizeof(struct node);

head->data = 7;
head->next = NULL;

struct node *newNode;
newNode= malloc(sizeof(struct node);
```



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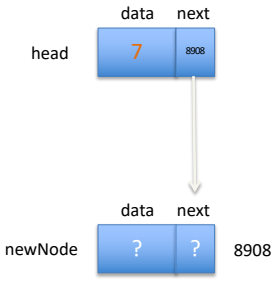
Struct

```
struct node{
   int data;
   struct node *next; // pointer to the next node
};
```

```
struct node *head;
head = malloc(sizeof(struct node);

head->next = newNode;
```



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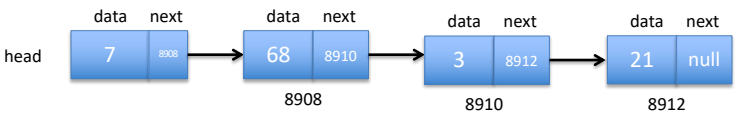
Struct



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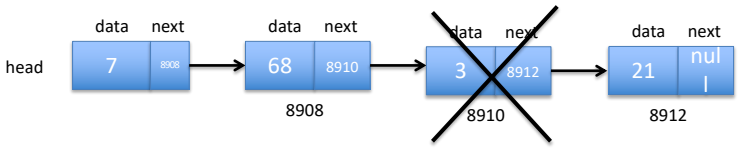
Struct



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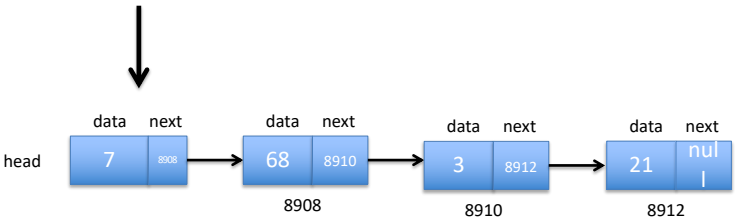
Struct

remove(3);



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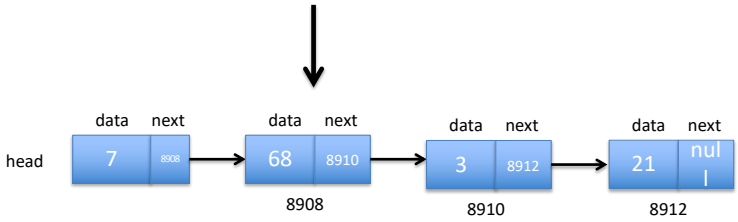
Struct

remove(3);



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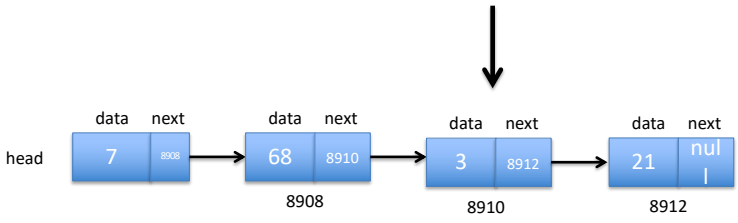
Struct

remove(3);



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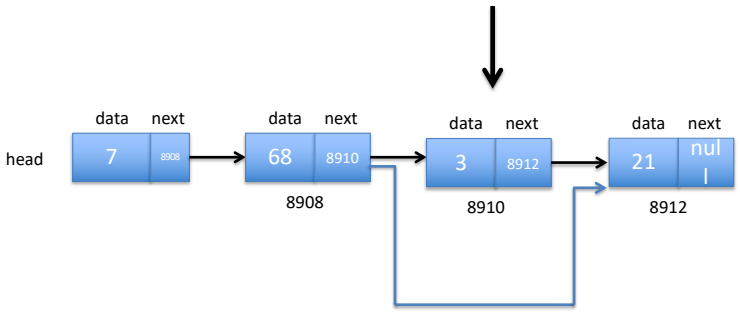
Struct

remove(3);



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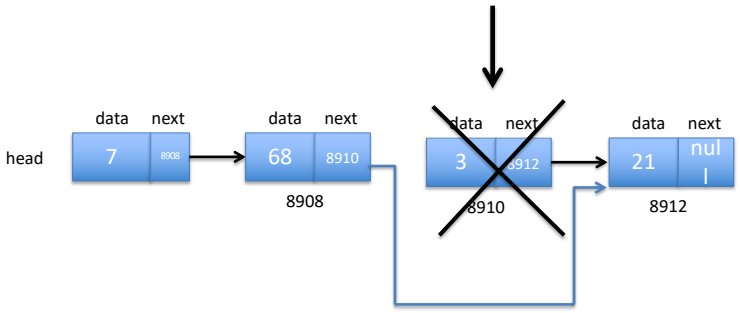
Struct

remove(3);



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Struct

```
#include <stdlibh>
….
typedef struct node{
   int data;
   Node *next; // pointer to the next node
} Node;


Node*head;
head = malloc(sizeof(Node);

head->data = 7;
head->next = NULL;

Node *newNode;
newNode= malloc(sizeof(Node);
```


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Scanf to read more than one word

Scanset[]

scanf("%[^\n]s" , name)

Continue to read unless \n encountered

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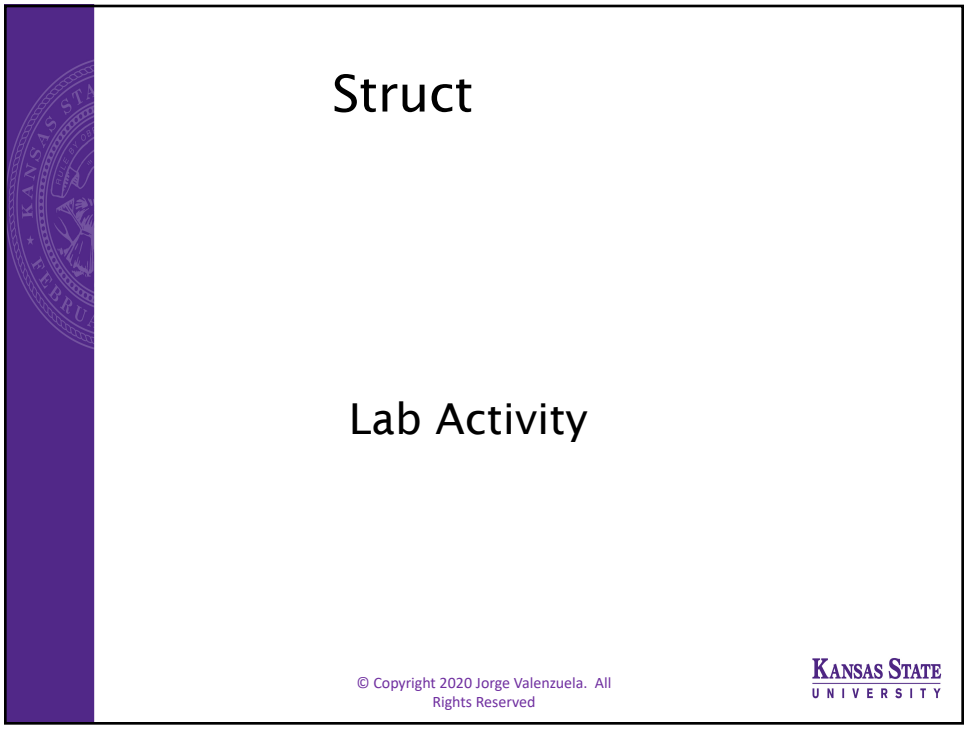
Struct
Lab Activity
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