

Introduction

Week 02 - Lecture 1

C Language

Team

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Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [1]

| Address | Type | Value | Name |
|----------|---------------|---------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357002 | c |
| 0x29ff10 | int | 1963357245 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | 0x40192e <__do_global_ctors+46> | e |
| 0x29ff20 | int * | 0x4018d0 <__do_global_dtors> | d |
| 0x29ff24 | int | 0 | b |
| 0x29ff28 | int * | <u>0x29ff0c</u> | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[1] int a, b, c, *d, *e, *f=&a, *g=&c;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;  
[2] a = 5;  
[3] b = 4;  
[4] d = &c;  
[5] e = &a;  
[6] g = 7;  
[7] *d = *d + *e + 1;  
[8] g++;  
[9] (*f)++;  
[10] int h, *k, *j=&h;  
[11] h = 10;  
[12] (*j)++;  
[13] b = *f + g + h;  
[14] (*f)++;  
[15] *d = a + *j;  
[16] *k = 13;
```

Exercise On Pointers 1 [2]

| Address | Type | Value | Name |
|----------|---------------|---------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357002 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | 0x40192e <__do_global_ctors+46> | e |
| 0x29ff20 | int * | 0x4018d0 <__do_global_dtors> | d |
| 0x29ff24 | int | 0 | b |
| 0x29ff28 | int * | <u>0x29ff0c</u> | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[2] a = 5;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [3]

| Address | Type | Value | Name |
|----------|---------------|---------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357002 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | 0x40192e <__do_global_ctors+46> | e |
| 0x29ff20 | int * | 0x4018d0 <__do_global_dtors> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | <u>0x29ff0c</u> | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[3] b = 4;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [4]

| Address | Type | Value | Name |
|----------|---------------|---------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357002 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | 0x40192e <__do_global_ctors+46> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | <u>0x29ff0c</u> | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of

[4] d = &c;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [5]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357002 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | <u>0x29ff0c</u> | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[5] e = &a;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [6]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357002 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0x7 | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of

[6] g = 7;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [7]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0x7 | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of

$$[7] *d = *d + *e + 1;$$

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [8]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 5 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[8] g++;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [9]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 6 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | 0x29ff60 | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[9] (*f)++;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [10]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | -2 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 6 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | <u>0x29ff08</u> | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[10] int h, *k, *j=&h;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [11]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | 10 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 6 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | <u>0x29ff08</u> | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[11] h = 10;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [12]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | 11 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 6 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | <u>0x29ff08</u> | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 4 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[12] (*j)++;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [13]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | 11 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 6 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | <u>0x29ff08</u> | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 79 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of

$$[13] b = *f + g + h;$$

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [14]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | 11 | h |
| 0x29ff0c | int | 1963357008 | c |
| 0x29ff10 | int | 7 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | <u>0x29ff08</u> | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 79 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

Stack after execution of
[14] (*f)++;

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [15]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff08 | int | 11 | h |
| 0x29ff0c | int | 18 | c |
| 0x29ff10 | int | 7 | a |
| 0x29ff14 | int * | 0x4018d0 <__do_global_dtors> | k |
| 0x29ff18 | int * | <u>0x29ff08</u> | j |
| 0x29ff1c | int * | <u>0x29ff10</u> | e |
| 0x29ff20 | int * | <u>0x29ff0c</u> | d |
| 0x29ff24 | int | 79 | b |
| 0x29ff28 | int * | 0xb | g |
| 0x29ff2c | int * | <u>0x29ff10</u> | f |
| 0x29ff38 | start address | | |

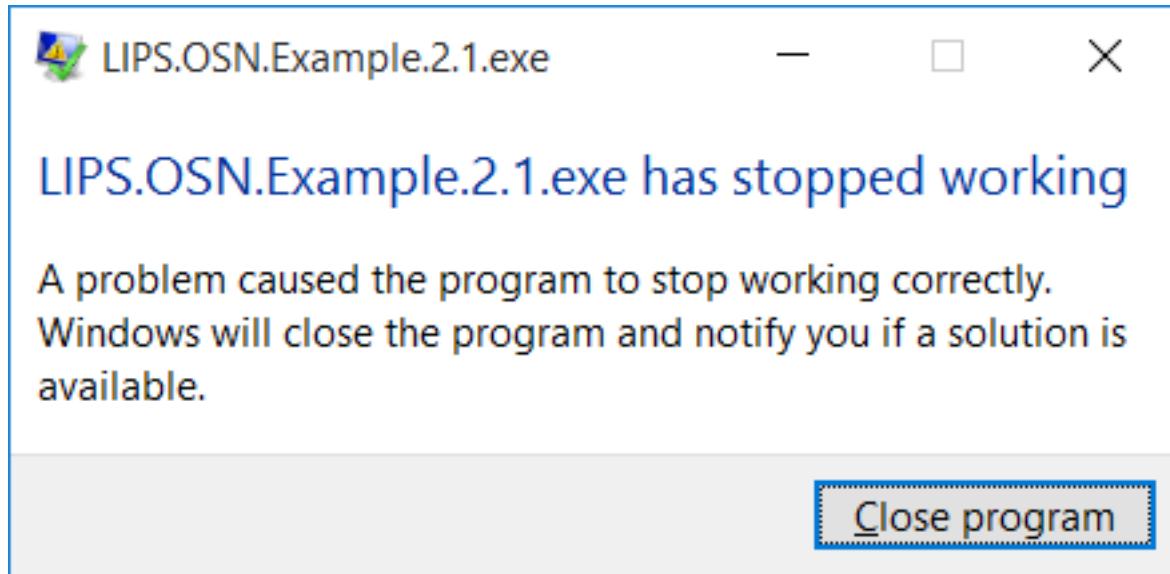
Stack after execution of

$$[15] *d = a + *j;$$

Exercise On Pointers 1

```
[1] int a, b, c, *d, *e, *f=&a, *g=&c;
[2] a = 5;
[3] b = 4;
[4] d = &c;
[5] e = &a;
[6] g = 7;
[7] *d = *d + *e + 1;
[8] g++;
[9] (*f)++;
[10] int h, *k, *j=&h;
[11] h = 10;
[12] (*j)++;
[13] b = *f + g + h;
[14] (*f)++;
[15] *d = a + *j;
[16] *k = 13;
```

Exercise On Pointers 1 [16]



Stack after execution of
[16] *k = 13;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [1]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 2752352 | f |
| 0x29ff1c | int | 4200798 | a |
| 0x29ff20 | int * | 0x401900 <__do_global_dtors> | d |
| 0x29ff24 | int * | 0x0 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 2752284 | c |
| 0x29ff38 | start address | | |

Stack after execution of

[1] int a, *b, c=&a, *d, f, g=&f;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [2]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 2752352 | f |
| 0x29ff1c | int | 4200798 | a |
| 0x29ff20 | int * | 0x401900 <__do_global_dtors> | d |
| 0x29ff24 | int * | 0x0 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[2] c = 10;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [3]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 2752352 | f |
| 0x29ff1c | int | 4200798 | a |
| 0x29ff20 | int * | 0x401900 <__do_global_dtors> | d |
| 0x29ff24 | int * | 0x4 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[3] b = 4;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [4]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 2752352 | f |
| 0x29ff1c | int | 4200799 | a |
| 0x29ff20 | int * | 0x401900 <__do_global_dtors> | d |
| 0x29ff24 | int * | 0x4 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[4] a = a + 1;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [5]

| Address | Type | Value | Name |
|----------|---------------|------------------------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803200 | f |
| 0x29ff1c | int | 4200799 | a |
| 0x29ff20 | int * | 0x401900 <__do_global_dtors> | d |
| 0x29ff24 | int * | 0x4 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[5] f = a + b;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [6]

| Address | Type | Value | Name |
|----------|---------------|----------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803200 | f |
| 0x29ff1c | int | 4200799 | a |
| 0x29ff20 | int * | 0x4b0d48 | d |
| 0x29ff24 | int * | 0x4 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[6] d = malloc(sizeof(int));

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [7]

| Address | Type | Value | Name |
|----------|---------------|----------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803200 | f |
| 0x29ff1c | int | 4200799 | a |
| 0x29ff20 | int * | 0x4b0d48 | d |
| 0x29ff24 | int * | 0x4 | b |
| 0x29ff28 | int | 2752280 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |



Stack after execution of
[7] *d = 20;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [8]

| Address | Type | Value | Name |
|----------|---------------|----------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803200 | f |
| 0x29ff1c | int | 4200799 | a |
| 0x29ff20 | int * | 0x4b0d48 | d |
| 0x29ff24 | int * | 0x4 | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[8] g = g + a;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [9]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803200 | f |
| 0x29ff1c | int | 4200799 | a |
| 0x29ff20 | int * | 0x4b0d48 | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[9] b = &a;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [10]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803200 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | 0x4b0d48 | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of

$$[10] *b = *d + g;$$

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [11]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803201 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | 0x4b0d48 | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[11] f++;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [12]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803201 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[12] d = &f;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [13]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 16803201 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff18</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[13] b = d;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [14]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 23756300 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff18</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of

$$[14] *b = a + f;$$

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [15]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 30709399 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff18</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of

$$[15] *d = *d + a;$$

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [16]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 68371907 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff18</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 10 | c |
| 0x29ff38 | start address | | |

Stack after execution of

[16] f = a + *b + *d + c;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [17]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 68371907 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff18</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 11 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[17] c++;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [18]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 68371907 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953079 | g |
| 0x29ff2c | int | 11 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[18] b++;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [19]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 68371907 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953080 | g |
| 0x29ff2c | int | 11 | c |
| 0x29ff38 | start address | | |

Stack after execution of
[19] g++;

Exercise On Pointers 2

```
[1] int a, *b, c=&a, *d, f, g=&f;
[2] c = 10;
[3] b = 4;
[4] a = a + 1;
[5] f = a + b;
[6] d = malloc(sizeof(int));
[7] *d = 20;
[8] g = g + a;
[9] b = &a;
[10] *b = *d + g;
[11] f++;
[12] d = &f;
[13] b = d;
[14] *b = a + f;
[15] *d = *d + a;
[16] f = a + *b + *d + c;
[17] c++;
[18] b++;
[19] g++;
[20] f = a + b + *d;
```

Exercise On Pointers 2 [20]

| Address | Type | Value | Name |
|----------|---------------|-----------------|------|
| 0x29ff00 | end address | | |
| 0x29ff18 | int | 304052308 | f |
| 0x29ff1c | int | 6953099 | a |
| 0x29ff20 | int * | <u>0x29ff18</u> | d |
| 0x29ff24 | int * | <u>0x29ff1c</u> | b |
| 0x29ff28 | int | 6953080 | g |
| 0x29ff2c | int | 11 | c |
| 0x29ff38 | start address | | |

Stack after execution of

$$[20] f = a + b + *d;$$

End

Week 02 - Lecture 1