C Programming
Day20.B

2017.11.28

Introduction to Data Structures

```c
#include <stdio.h>

struct aaa {
  int         data;   // 4-byte
  struct aaa *next;   // 8-byte
} ;


typedef struct node node;

struct node {
  int   data;   // 4-byte
  node *next;   // 8-byte
} ;

int main(void) {
  struct aaa var1;
  node var2;


  var1.data = 111;
  var1.next = NULL;

  printf("var1.next = %p \n", var1.next);
  printf("var1.data = %d \n", var1.data);

  printf("sizeof(var1) = %ld \n", sizeof(var1));

  var2.data = 111;
  var2.next = NULL;

  printf("var2.next = %p \n", var2.next);
  printf("var2.data = %d \n", var2.data);

  printf("sizeof(var2) = %ld \n", sizeof(var2));

}
```

```c
typedef struct node node;

struct node {
  int   data;   // 4-byte
  node *next;   // 8-byte
} ;

int main(void) {
  node n1, n2, n3;
  node *sp = NULL;
  node *ep = NULL;
  node *p  = NULL;

  sp = &n1;
  ep = &n3;

  n1.data = 111;
  n1.next = &n2;

  n2.data = 222;
  n2.next = &n3;

  n3.data = 333;
  n3.next = NULL;

  printf("&n1 = %p  sizeof(n1)=%ld \n", &n1, sizeof(n1));
  printf("&n2 = %p  sizeof(n2)=%ld \n", &n2, sizeof(n2));
  printf("&n3 = %p  sizeof(n3)=%ld \n", &n3, sizeof(n3));

  printf("sp  = %p  \n", sp);
  printf("ep  = %p  \n", ep);
```

```
  printf("n1.data = %d \n", n1.data);
  printf("n1.next = %p \n", n1.next);

  printf("n2.data = %d \n", n2.data);
  printf("n2.next = %p \n", n2.next);

  printf("n3.data = %d \n", n3.data);
  printf("n3.next = %p \n", n3.next);

  printf("-------------------------\n");

  p = sp;
  printf("p = sp \n");
  printf("\t\tp->data = %d \n", p->data);
  printf("\t\tp->next = %p \n", p->next);

  p = p->next;
  printf("p = p->next \n");
  printf("\t\tp->data = %d \n", p->data);
  printf("\t\tp->next = %p \n", p->next);

  p = p->next;
  printf("p = p->next \n");
  printf("\t\tp->data = %d \n", p->data);
  printf("\t\tp->next = %p \n", p->next);

  p = p->next;
  printf("p = p->next \n");


  printf("-------------------------\n");

  p = sp;

  while (p) {
    printf("\t\tp->data = %d \n", p->data);
    printf("\t\tp->next = %p \n", p->next);

    p = p->next;
  }


}
```

```
&n1 = 0x7ffd7c981fc0  sizeof(n1)=16
&n2 = 0x7ffd7c981fd0  sizeof(n2)=16
&n3 = 0x7ffd7c981fe0  sizeof(n3)=16
sp  = 0x7ffd7c981fc0
ep  = 0x7ffd7c981fe0
n1.data = 111
n1.next = 0x7ffd7c981fd0
n2.data = 222
n2.next = 0x7ffd7c981fe0
n3.data = 333
n3.next = (nil)
-------------------------
p = sp
                p->data = 111
                p->next = 0x7ffd7c981fd0
p = p->next
                p->data = 222
                p->next = 0x7ffd7c981fe0
p = p->next
                p->data = 333
                p->next = (nil)
p = p->next
-------------------------
                p->data = 111
                p->next = 0x7ffd7c981fd0
                p->data = 222
                p->next = 0x7ffd7c981fe0
                p->data = 333
                p->next = (nil)
```