Computer Architecture CS-211

Spring 2017

Recitation #3

Pointer example

- Address Byte offset
  ---------0 --1-- 2-- 3
  0x04 │ 10 00 00 00
  0x08 │ 61 72 62 33
  0x0c │ 33 00 00 00
  0x10 │ 78 0c 00 00
  0x14 │ 08 00 00 00
  0x18 │ 01 00 4c 03
  0x1c │ 18 00 00 00

- Assume little-Endian machine
- Pointer size = 4 bytes in 32-bit machine
- int = 4 bytes , short = 2 bytes , char = 1 byte
- Operator precedence : http://en.cppreference.com/w/c/language/operator_precedence

```
int **i=(int **)0x04;
short **pps=(short **)0x1c;
struct i2c {
    int i;
    char *c;
}*p=(struct i2c*)0x10;
```

**i == ?   0xc78

p->c[2] == ?   '62'

&(*pps)[1] = ?   0x1A

Link list example

Reverse a Linked List using Recursion

1)Divide the list in two parts - first node and rest
2)Call reverse for the rest of the linked list.
3) Link rest to first.
4) Fix head pointer

```c
void recursiveReverse(struct node** head_ref)
{
    struct node* first;
    struct node* rest;

    /* empty list */
    if (*head_ref == NULL)
        return;

    first = *head_ref;
    rest  = first->next;

    /* List has only one node */
    if (rest == NULL)
        return;

    /* put the first element on the end of the list */
    recursiveReverse(&rest);
    first->next->next  = first;

    /* tricky step */
    first->next  = NULL;

    /* fix the head pointer */
    *head_ref = rest;
}
```

2's Complement

How to find 2's complement format of a given number easily ?

Questions

1. Find the 2's complement representation of -525 (in Hex)?   FDF3
2. The largest positive value in N-bit two's complement is ? $2^{(n-1)}-1$
3. The smallest negative value in N-bit two's complement is ? $-2^{(n-1)}$