ENGG1340 Computer Programming II

Module 8 Self-Review Exercise

1. Given the following declarations:

```
int x;
int * ptr1, * ptr2;
double * ptr3;
```

Which of the following statements is invalid? Explain why.

(a) `ptr1 = ptr2;`
(b) `x = ptr1;`
(c) `*ptr3 = *ptr2;`
(d) `x = *ptr2;`
(e) `ptr1 = &ptr2;`
(f) `x = &ptr1;`

2. What is the output of the following C++ code?

```
int x;
int y;
int * p = &x;
p = &y;
*p = 10;
x = y + 20;
p = &x;
y = 25;
*p = 50;
cout << *p << " " << x << " " << y << endl;
```

3. What is the output of the following C++ code?

```
int *x = new int;
int *y;
*x = 60;
y = x;
*y = *y + *x;
x = new int;
*x = *y - 20;
cout << *x << " " << *y << endl;
```

4. What is wrong with the following C++ code?

```
double *x = new double;
double *y = new double;
*x = 10;
y = x;
delete x;
delete y;
x = new double;
*x = 20;
cout << *x << " " << *y << endl;
```

5. Given the following declarations:

```
int * aPtr;               // aPtr should point to array a
int n;
int a[5] = { 1, 2, 3, 4, 5 };
```

State the error in each of the following statements:

(a)
```
++aPtr;
```

(b)
```
n = aPtr;           // use pointer to get the first value of array
```

(c)
```
n = *aPtr[2];       // assign 2nd element of array to n
```

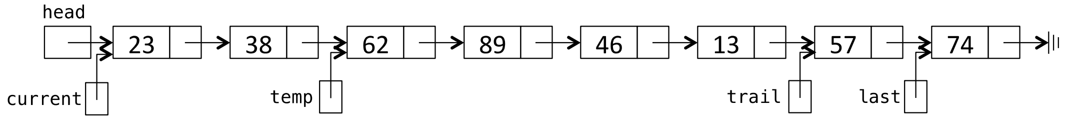
(d)
```
// print entire array
for (int i = 0; i <= 5; ++i)
      cout << aPtr[i] << endl;
```

(e)
```
++a;
```

6. What is stored in array after the following code executes?

```
int array[7] = { 4, 8, 9, 1, 13, 32, 20};
int * ptr = array;
*ptr = *ptr + 5;
ptr = ptr + 2;
*ptr = (*ptr) - *(ptr - 1);
ptr++;
*ptr = 5 * (*ptr) - 2;
```

Consider the linked list shown below:



Assume that the nodes are defined as the following structure:

```
struct Node {
   int info;
   Node * next;
};
```

and that the pointers `head`, `current`, `temp`, `trail` and `last` are all of type `Node *`.
Use the above list to answer questions 1 to 5.

7. What is the output, if any, of each of the following statements:
   (a) `cout << current->info;`
   (b) `cout << temp->next->next->info;`
   (c) `cout << last->next->info;`

8. What is the value of each of the following relational expression?
   (a) `current->next == temp`
   (b) `trail->next->next == 0`
   (c) `head == current`

9. Write C++ statements to do the following:
   (a) Set the `info` of the second node to `100`.
   (b) Make `trail` point to the node before `temp`.
   (c) Write a `while` loop to make `current` point to the node with `info` 46.

10. Write C++ statements to do the following:
    (a) Create the node with `info` 90 and insert between `trail` and `last`.
    (b) Delete the last node of the list and also deallocate the memory occupied by this node. After deleting the node, make `last` point to the last node of the list and the link of the last node must be `NULL`.

11. If the following C++ code is valid, show the output. If it is invalid, explain why.

```
temp = current;                 // Line 1
current = current->next;        // Line 2
current->next = last;           // Line 3
trail = current-> next;         // Line 4
trail = trail->next;            // Line 5
cout << current->info << " " << trail->info << endl;       // Line 6
```