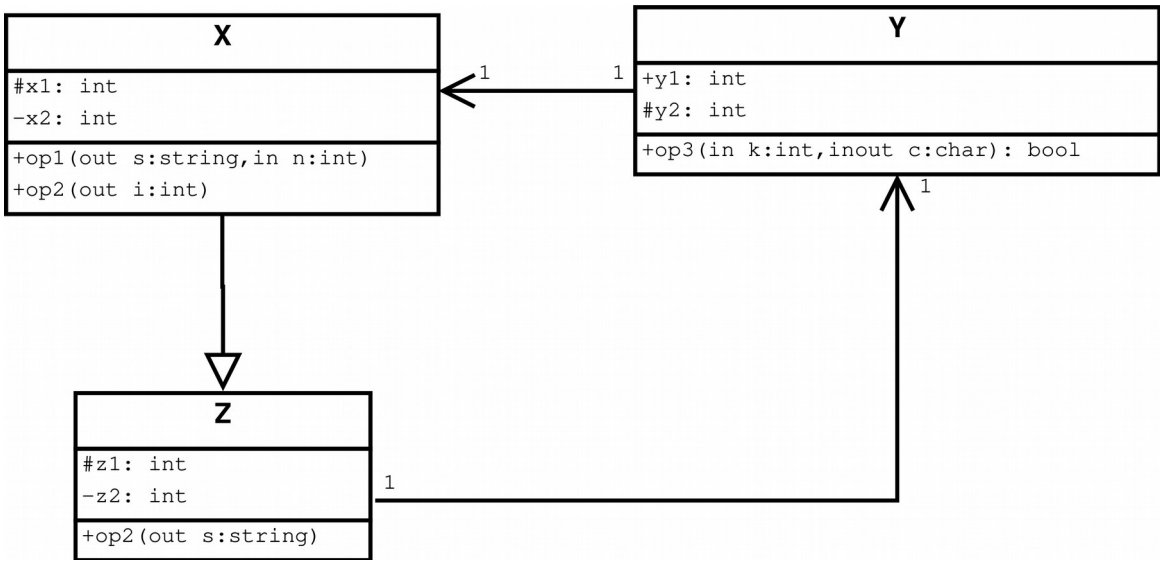
COMP 2404

Midterm Exam Solution -- Version 2

1. [2 marks] a
2. [2 marks] d
3. [2 marks] a
4. [2 marks] c
5. [2 marks] b

6. [20 marks]



Grading:

- 2 marks: X attributes with correct access specifier, 1 mark each
- 3 marks: X operations, 1 mark each correct parameter
- 2 marks: Z attributes with correct access specifier, 1 mark each
- 1 mark: Z operation
- 2 marks: Y attributes with correct access specifier, 1 mark each
- 3 marks: Y operations, 1 mark each correct parameter and return type
- 3 marks: inheritance relationship between X and Z
- 2 marks: composition relationship between X and Y, with directionality and multiplicity
- 2 marks: composition relationship between Y and Z, with directionality and multiplicity
- -1 mark: each object shown as attribute

7. [10 marks]

```
Animal* Dlist::popBack()
{
  Animal* goner;  Node* currNode, *lastNode;

// 2 marks for dealing with empty list case
  if (head == 0)
    return 0;

// 2 marks for finding the last node
  lastNode = 0;
  currNode = head;
  while (currNode != 0) {
    lastNode = currNode;
    currNode = currNode->next;
  }

// 1 mark for saving the last element
  goner = lastNode->data;
// 2 marks for dealing with last remaining element case
  if (lastNode->prev == 0)
    head = 0;
// 1 mark for dealing with regular case
  else
    lastNode->prev->next = 0;

// 1 mark for deleting last node
  delete lastNode;
// 1 mark for returning the last element
  return goner;
}
```

8. [10 marks]

```
void Tlist::pushFront(Animal* critter)
{
  Node* newNode;

// 2 marks for allocating new node
// 2 marks for initializing data and next
  newNode = new Node;
  newNode->data = critter;
  newNode->next = 0;

// 3 marks for dealing with empty list case
  if (head == 0) {
    head = tail = newNode;
  }
// 3 marks for dealing with regular case
  else {
    newNode->next = head;
    head = newNode;
  }
}
```