

**THE HONG KONG POLYTECHNIC UNIVERSITY**  
**Department of Electronic and Information Engineering**

**Computer Programming (ENG236) - Homework 4**

**PART 1**

By using Visual Studio .NET, implement a console application that creates a linked list of 4 objects of the class CAT. Ask the user to give each CAT object a name. The class CAT is given below:

```
class CAT
{
public:
    CAT() {pNext = 0;}           // Constructor - set $pNext to NULL by default
    void setName(char *nm)
    {
        strncpy (name,nm,79);   // copy nm to $name and make sure there must
        name[79] = NULL;       // be a NULL character at the end of name
    }
    char * getName()           // get the name of a CAT
    {
        return name;
    }
    void setNext(CAT *pC)      // $pNext = pC
    {
        pNext = pC;
    }
    CAT * getNext()           // return $pNext
    {
        return pNext;
    }
private:
    char name[80];             // Keep the name of the CAT
    CAT * pNext;
};
```

After the linked list has been created, ask the user to give an arbitrary CAT name. If the name the user entered can be found in the linked list, show the message “xxx is found!”, where xxx is the name of the CAT the user entered. Otherwise, return the message “xxx cannot be found!”.

Finally, free the memory used for storing the linked list before quitting the program.

**PART 2**

Redesign the program you have written in Part 1 by following the guidelines below:

1. Show the following menu on the screen in Console mode:

- A. Insert a CAT to the linked list
- B. Delete a CAT from the linked list
- C. Show all CAT objects
- Q. Quit

Your choice (A, B, C or Q):

2. Your program should repeatedly ask the user to input their choice.

- a. If the user chooses A, let the user enter the name of a CAT and the position of the linked list where this CAT object is to be inserted. The first item is in position 0. Report an error message if the

position cannot be realized in practice. Get back to the main menu after adding the `CAT` object in the linked list.

- b. If the user chooses `B`, let the user enter the position of the linked list where the `CAT` object is to be deleted. Report an error message if the position cannot be realized in practice. Get back to the main menu after deleting the `CAT` object in the linked list.
- c. If the user chooses `C`, the name(s) of all `CAT` object(s) in the linked list should be shown.
- d. If user chooses `Q`, show the message “Goodbye!” and quit the program. Remember to free all memory that you used to store the `CAT` objects in the linked list.

Notes:

- i. Develop your program using C++ under the Visual Studio 2005 environment.
- ii. It is mandatory to use the linked list approach to implement the program.
- iii. Remember to check whether the insert or delete position is valid.
- iv. You need to follow exactly the requirements of the questions as shown above when developing your programs.
- v. Try to explain your program as clear as possible using comments.