Name _____

Section _____

CS2303 C08
Systems Programming Concepts
Mid Term Exam
February 1, 2008

Question	Points	Score
0	1	
1	5	
2	4	
3	5	
4	20	
5	12	
6	18	
7	16	
Total	80	

Trivia Question (1 extra credit point)

0. (a) Where will the Superbowl by played in 2009?

-OR-

(b) Who was the last American Vice President to be elected President?

1. Given the following screen output from a ccc computer and assume you are fred:

```
$ pwd
/home/fred/q1
$ cd qlow
$ ls -la
total 8
drwxr-x---  2 fred 6810 4096 Jan 30 14:52 .
drwxr-x---  3 fred 6810 4096 Jan 30 14:49 ..
 -rwx------  1 fred 6810   12 Jan 30 14:37 file1.c
 -rwx------  1 fred 6810   34 Jan 30 14:38 fileB.c
```

(4 pts) a. Give the necessary command lines to copy file1.c to /home/fred/q1/fileA.c.

(1 pt) b. Which file is larger fileB.c or file1.c?

(2 pts) 2a. Explain how a pointer gets typed.

(2 pts) 2b. How does the type of a pointer affect pointer arithmetic?

(2 pts) 3a. Name the two most important concerns when evaluating computer system.

(3 pts) 3b. Using a queuing system model define the mean response time of **n** customers in a cpu scheduler.

(20 pts) 4. What is the output from this program?

```
int gl = 4;
float zippy (float y, int i)
{
  static z = 5.0;
  --z;
  return 2*i + y - z;
}
int mix( int i, int v[5], float j)
{
  int t[5] = {3, 6, 9};
  t[i] = (int)j - i;
  gl = gl*gl;
  v[i] = 10*gl;
  j = i + 3.0;
  i++;
  t[i+1]++;
  printf("A : %d %6.2f %d %d\n",  i, j, gl, t[i]);
  return t[i];
}
int main ()
{
  int i=1, j, k;
  int t[5] = {50,60,70,80};
  float x, y, z;

  x = (float)i/2;
  y = 8.0*i;
  z = y/5;
  j = 20;
  printf("%6.2f %6.2f %6.2f\n", x, y, z);
  for (k = 0; k< 2; k++)
    {
      gl = mix(i,t,(float)j);
      j = zippy(z,t[i]);
      printf("Main: %d %d %d %d\n",
          i, j, gl, t[i]);
      i++;
    }
  printf("T:");
  for (j = 0; j < 5; j++)
    printf(" %d", t[j]);
  return 0;
}
```

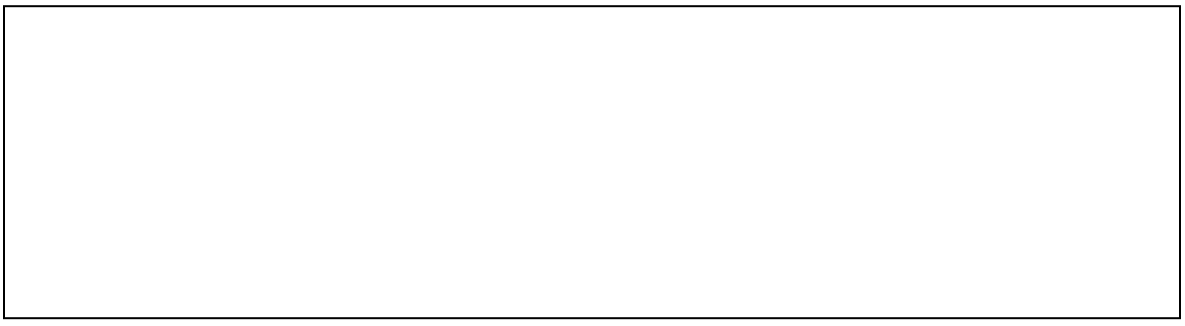
Output Box

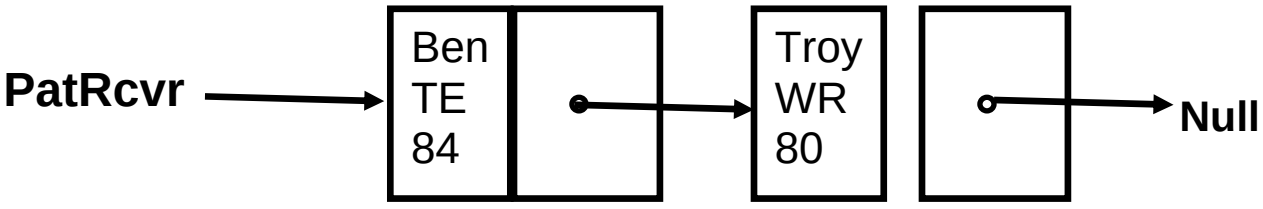
(15 pts) 5. What is the output from this program?

```
#define SIZE 3
int main ()
{
  int i, y[SIZE] = {100,300,500};
  int x[SIZE] = {4000};
  int *Sptr, *Fptr;

  Fptr = (int *) malloc(sizeof (i));
  Sptr = (int *) malloc(sizeof (i));
  Fptr = x;
  for (i=0; i < SIZE; i++)
  {
    *Fptr = y[2-i] + 20*i;
    Fptr++;
    printf("i = %d y = %d x = %d\n", i, y[i], x[i]);
  }
  *Sptr = *(--Fptr);
  printf ("%d %d %d\n", y[i-1],*(Fptr-1),*Sptr);
  Sptr = (int *) malloc(sizeof (i));
  printf ("%d %d\n", *Sptr, *Fptr);
  *Sptr = *(Fptr-2);
  Fptr = (int *) malloc(sizeof (i));
  free(Fptr);
  printf ("%d %d\n", *Sptr, *Fptr);
  return 0;
}
```

Output Box





(16 pts) 6a. Assume the linked list **PatRcvr** currently looks like the figure above. Write inline code (not a separate fcn) that assumes that **PatRcvr** is ordered by number and not NULL to insert a new node with contents (Randy, 81, WR) into **PatRcvr** in the correct position in the linked list.

(2 pts) Redraw the linked list to show its contents after this insertion.

```
#include <stdio.h>
typedef struct{
  char *name;
  char *position;
  int number;
  struct Player *pptr;
} Player;
typedef Player *Pptr;
const char *names[] = {"Tom", “Troy’, "Randy", "Ellis","Ben", “Wes”};
const int nums[6] = {12, 80, 81, 27, 84, 83};
const char *pos[] = {"QB", “WR”,"WR", "CB","TE", “WR”};

Pptr createnode (int index)
{
  Pptr newPtr;

  newPtr =malloc(sizeof(Player));

  newPtr->name = names[index];
  newPtr->position = pos[index];
  newPtr->number = nums[index];
  newPtr->pptr = NULL;
  return newPtr;
}
int main()
{
  Pptr PatRcvr = NULL;
  Pptr RcvPtr;
  int i;
... /* PatRcvr has two nodes on list as above  */
```

```
  return;
}
```

(16 pts) 7**.** Smashball has been expanded to allow players to move in 8 directions

Write a simple function **diag-NE** to test movement in the Northeast direction. This is the function protptype:

diag-NE (char figure[SIZE] [SIZE], char schar, int row, int col);

After filling the figure with blanks, **diag-NE**, puts **schar** into location **row, col** in the figure. The function continues by moving in the Northeast direction (one row up, one column right) depositing **schar** in the new spot until it has reached an edge (top or right). After depositing schar on the edge, the function returns.

As an example assume the call to the function is inside this code snippet:

```
#define SIZE 40
enum direction {E, NE, N, NW, W, SW, S, SE};

Int BLANK = ' ';
int main {
char field [SIZE][SIZE]

dir = …
switch (dir)

    case NE:
          diag-NE( field, 'D', 20, 18 )
          break;
}
int diag-NE (char figure[SIZE][SIZE], char schar, int row, int col)
{
  int i,j;
  for (i=0; i < SIZE; i++)
    for (j=0; j < SIZE; j++)
      figure[i][j] = BLANK;









}
```

A: This is an intentional Blank page to show your work!