Semester One of Academic Year (2014---2015) of BJUT

《 Programming 1 》 Exam Paper A/B

Exam Instructions： Answer ALL Questions

Honesty Pledge：

I have read and clearly understand the Examination Rules of Beijing University of Technology and am aware of the Punishment for Violating the Rules of Beijing University of Technology. I hereby promise to abide by the relevant rules and regulations by not giving or receiving any help during the exam. If caught violating the rules, I would accept the punishment thereof.

Pledger： ____________ **Class No：** ____________

BJUT Student ID： ____________ **UCD Student ID**____________

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Notes：

The exam paper has 2 parts on 12 pages, with a full score of 100 points. You are required to use the given scratch paper attached only.

Total Score of the Exam Paper（For teachers' use only）

Item	**Part 1**	**Part 2**			**Total Score**
Full Score					
Obtained Score					

Obtained score

Part 1: Terminology

These questions are concerned with your understanding of the basics of C. Answer all questions. There are 50 marks available in this part. The marks available for each question are written at the end of that question.

1. List the basic data types we have used on the course. Give a description of the kinds of values that can be held by the data type and give an example of a value.

Type 1: _____ Description: _____

_____

Example: _____

Type 2: _____ Description: _____

_____

Example: _____

Type 3: _____ Description: _____

_____

Example: _____

(9 marks)

2. `scanf()` is a function that allows the program to receive input through standard output. Give the format specifiers for each of the following types:

`int` _____ `float` _____ `char` _____ `string` _____

(4 marks)

3. Write down program code for a fixed increment for loop that starts at fifty (50) and ends at zero (50), with a decrement of one (1) on each iteration. The body of the loop should printout each number on a new line. The output therefore should be a loop counting down from 50.

(6 marks)

4. What is a *constant*? Illustrate your answer by writing down the code to declare a constant *and* to use it within a program.

(4 marks)

5. What is a *function*?

(3 marks)

When writing a function, what is the difference between a *global variable* and a *local variable*?

(2 marks)

What is a string and how do declare a string in C? Explain how you make character array into a string .

(3 marks)

6. Each of the following functions manipulates files. Describe what each one does

`fopen(char[],char[])` _____

_____

`getc(FILE *fp)` _____

_____

`putc(char, FILE *fp)` _____

_____

`feof(FILE *fp)` _____

_____

`fclose(FILE *fp)` _____

_____

(12 marks)

7. Write a fragment of code that reads in all the integer numbers from the file “numbers.txt”. It is uncertain how many numbers are in the file. Your code should print out all the values you read.

(7 marks)

Obtained score

Part 2: Program Comprehension

For each of the questions below, you will be required to read the program and answer questions about it. There will be 10 marks per question with a total of 50 marks available.

1.

```
#include <stdio.h>

int main()
{
    int num;
    printf("enter a number: ");
    scanf("%d", &num);
    printf("you entered: ");
    if (num < 10000) printf("0");
    if (num < 1000) printf("0");
    if (num < 100) printf("0");
    if (num < 10) printf("0");
    printf("%d\n", num);
}
```

Explain what this program does.

_____

_____

(5 marks)

what is the expected output of the program if the user enters the number 888?

(5 marks)

2.

```
#include<stdio.h>

main()
{
   int values[100];
   int i, target = 6;
   char input[100];
   load("test.dat", values, 10);

   for (i=0; i < 10; i++)
      if (values[i] == target)
      {
         printf("%d is at %d\n", target, i);
         exit(0);
      }

   printf("%d was not there\n", target);
}
```

Here, you may assume that the function `load(char name[], int values[], int N)` will read `N` integer values from the file with name `name` and store those values in array `values`.

The file test.dat contains the following values

```
10 12 9 6 8 2 15 9 17 18
```

What is the purpose of the program?

_____

_____

_____

(5 marks)

What is the expected output of the program?

(5 marks)

3.

```
#include <stdio.h>
#define MAX 50

main()
{
   int i, sum;
   sum = 0;
   for(i=0; i < MAX; i++)
      if (i % 10 == 0)
       {
            sum = sum + i
       }
   printf("Result: %d", sum);
}
```

This program does not compile. Why?

_____

_____

(3 marks)

Ignoring the compilation error, explain what this program does.

_____

_____

(3 marks)

What is the expected output of the program?

(4 marks)

4.

```
#include <stdio.h>

int main() {
   printf( "Enter some characters: " );
   int l = 0;
   char c = getchar();
   while(c != '\n' ) {
      if ( c < 'a' || c > 'z' )
         l++;
      c = getchar();
   }
   printf( "Final value is: %d\n", l );
}
```

When prompted, the user enters the following values:

```
I don’t see the point of this!
```

What is the purpose of the program?

_____

_____

_____

_____

(5 marks)

What is the expected output of the program?

(5 marks)

5.

```
void sort(int values[], int N)
{
   for (i=1; i < N; i++)
   {
      X = A[i];
      h = i;
      while ((h > 0) && (A[h-1] > X))
      {
         A[h] = A[h-1];
         h--;
      }
      A[h] = X;
   }
}
```

What type of sort does this function implement? _____

(2 marks)

In a program, an array of size 10 is created that contains the following values:

```
5 9 2 7 12 8 6 15 1 3
```

The above sort function is then called. Write down the state of the array at the start of each iteration of the outer loop. The first 2 iterations have been completed for you.

i	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
0	5	9	2	7	12	8	6	15	1	3
1	1	9	2	7	12	8	6	15	5	3
2										
3										
4										
5										
6										
7										
8										
9										

(8 marks)

Scratch Paper

Name：_____ Student ID：_____