SENECA COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SCHOOL OF INFORMATION AND COMMUNICATIONS TECHNOLOGY – SY

Test #1 EXAMINATION (A)

SEMESTER	SUBJECT NAME	SUBJECT CODE
Summer 2019	Introduction to Programming Using C	IPC144

NAME: _____

STUDENT NUMBER: _____

SECTION: _____

TIME ALLOWED: 1.0 Hour (60 min.)

QUESTIONS:

Part A	Explain Concepts	9	Marks
Part B	Complete the Code	21	Marks
Part C	Walkthrough	10	Marks
	TOTAL MARKS	**40**	

PROFESSOR: Shi, Yue (Sunny)

SPECIAL INSTRUCTIONS:

1. A reference sheet is permitted and must be submitted with the test, 1 – 8 ½ X 11, white, 2 sided, printed from a computer-generated document, name and student ID on both sides
2. Write your answers in the spaces provided
3. A non-scientific calculator, you are not permitted to use your cell phone

This test includes a *cover page*, plus 4 pages of *questions*.

SENECA'S ACADEMIC INTEGRITY POLICY

As a Seneca student, you must conduct yourself in an honest and trustworthy manner in all aspects of your academic career. A dishonest attempt to obtain an academic advantage is considered an offense, and will not be tolerated by the College.

Part A: Explain Concepts [9 marks]

(1) Briefly describe the differences between all three iteration constructs. **[3 marks]**

(2) What is an *array* data structure? **[2 marks]**

(3) What is a *structure* type? **[2 marks]**

(4) Briefly explain why you may use the #*define* directive (e.g., #define SIZE 4). **[2 marks]**

Part B: Complete the code, referring to the comments and the sample run [21 marks]

```
//structCar.h
struct Car
{
	int year;
	double mile;
	char name[20];
};
//midterm_struct.c
#define _CRT_SECURE_NO_WARNINGS
#include <stdio.h>
// including the above header file: structCar.h   [1 mark]
#include "structCar.h"
#define SIZE 3
int main(void)
{
	int i, newCarNum, newCarYear, mostMileNum;
	double mostMile;
	struct Car carList[SIZE] = { {0,0.0, “”} };
	// set the year for car 1 as 2009
	carList[0].year = 2009;
	// set the mile for car 1 as 100000.5
	carList[0].mile = 100000.5;
	/* ask user to input the information for the rest cars, i.e., car 2 till car SIZE
(cars are counted from 1) */
	for (i = 1; i < SIZE; i++)
	{
		printf("Enter the year for car %d: ", i+1);
		scanf("%d", &carList[i].year);
		printf("Enter the mileage for car %d: ", i+1);
		scanf("%lf", &carList[i].mile);
	}
	/* report the number of the newest car and the car with the most mileage (cars are
counted from 1). Refer to the sample run below. */
	newCarNum = 0;
	mostMileNum = 0;
	newCarYear = carList[0].year;
	mostMile = carList[0].mile;
	for (i = 0; i < SIZE; i++)
	{
		if (carList[i].year > newCarYear  && flag ==0)
		{
			newCarYear = carList[i].year;
			newCarNum = i;
			break;
		       // i = SIZE;
		       // flag =1;

		}
		if (carList[i].mile > mostMile)
		{
			mostMile = carList[i].mile;
			mostMileNum = i;
		}
	} // for loop

	// referring to the sample run, display the newest car information
	printf("The newest car is car %d , year: %d.\n", newCarNum+1, newCarYear);
	// referring to the sample run, display the car with the most mileage, mileage in
2 decimals.
```

```
	printf("The car with the most mileage is car %d , mileage: %.2lf km.\n", mostMileNum+1, mostMile);

	return 0;
}
```

Sample run:

Enter the year for car 2: 2008
Enter the mileage (km) for car 2: 300000.5
Enter the year for car 3: 2019
Enter the mileage (km) for car 3: 2308.3
The newest car is car 3, year: 2019.
The car with the most mileage is car 2, mileage: 300000.50 km.

Part C: Walkthrough [10 marks]

What is the output (printed to the screen) of the following code? Show your rough work.

```
//midterm_walkthrough.c
#include <stdio.h>
int main(void)
{
	int a;
	double b, c;

	a = 6;
	b = 0.7;
	int flag=0
	while (a < 10 && b < 3.0 && flag==0) {
		if (a < 8 ) {
			a = a + 1;
			b = b * 2;
			c = a - b;
			flag = 1;
		}
		else {
			a = a - 2;
			b = b + 0.8;
		}
		c = a - b;
		printf("%.2lf-%d-%.2lf\n", c, a, b);
	}
}
```

Output:

5.60-7-1.40
5.20-8-2.80
2.40-6-3.60