LAB – 10

17BIT0028

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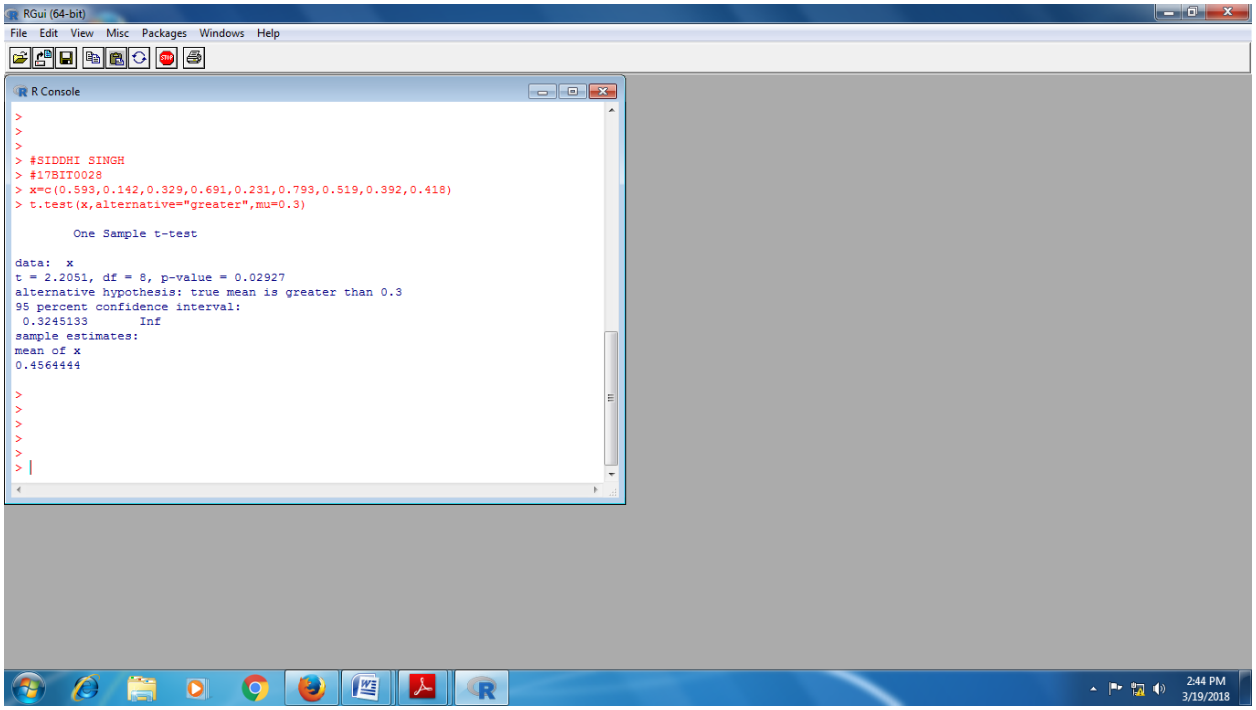
Problem 1 :-

An outbreak of salmonella-related illness was attributed to ice produced at a certain factory. Scientists measured the level of Salmonella in 9 randomly sampled batches ice crean.The levels(in MPN/g) were:

0.593	0.142	0.329	0.691	0.231	0.793	0.519	0.392	0.418

Is there evidence that the mean level pf Salmonella in ice cream greater than 0.3 MPN/g?

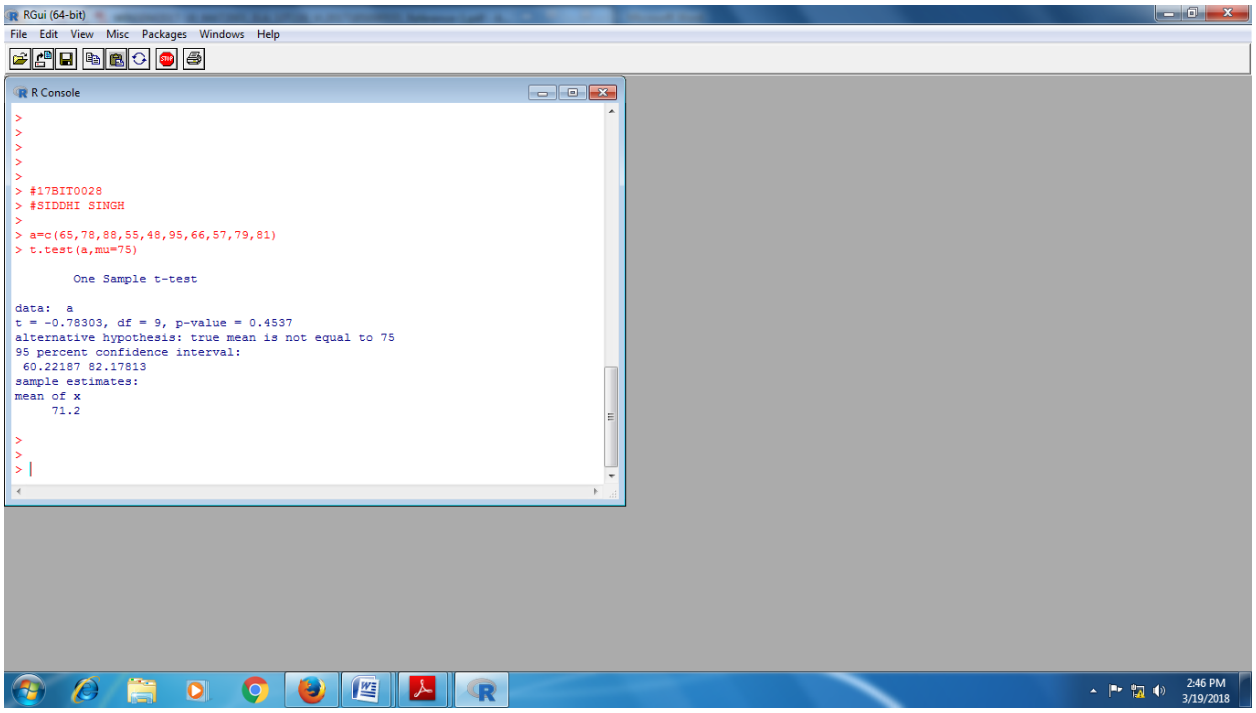


Inference:-

From the output we see that the p-value = 0.029. Hence, there is moderately strong evidence that the mean Salmonella level in the ice cream is above 0.3 MPN/g.

Problem 2: Suppose that 10 volunteers have taken an intelligence test; here are the results obtained. The average score of the entire population is 75 in the same test. Is there any significant difference (with a significance level of 95%) between the sample and population means, assuming that the variance of the population is not known.

Scores: 65, 78, 88, 55, 48, 95, 66, 57, 79, 81



Inference:-

- ➔ *The t-computed value is smaller than t-tabulated, we accept the null hypothesis of equality of the averages.*
- ➔ *Alternatively we could consider the p-value with a significance level of 95%. If* ***p-value is greater than 0.05*** *then* ***we accept the null hypothesis H0,*** *otherwise* ***we reject the null .***

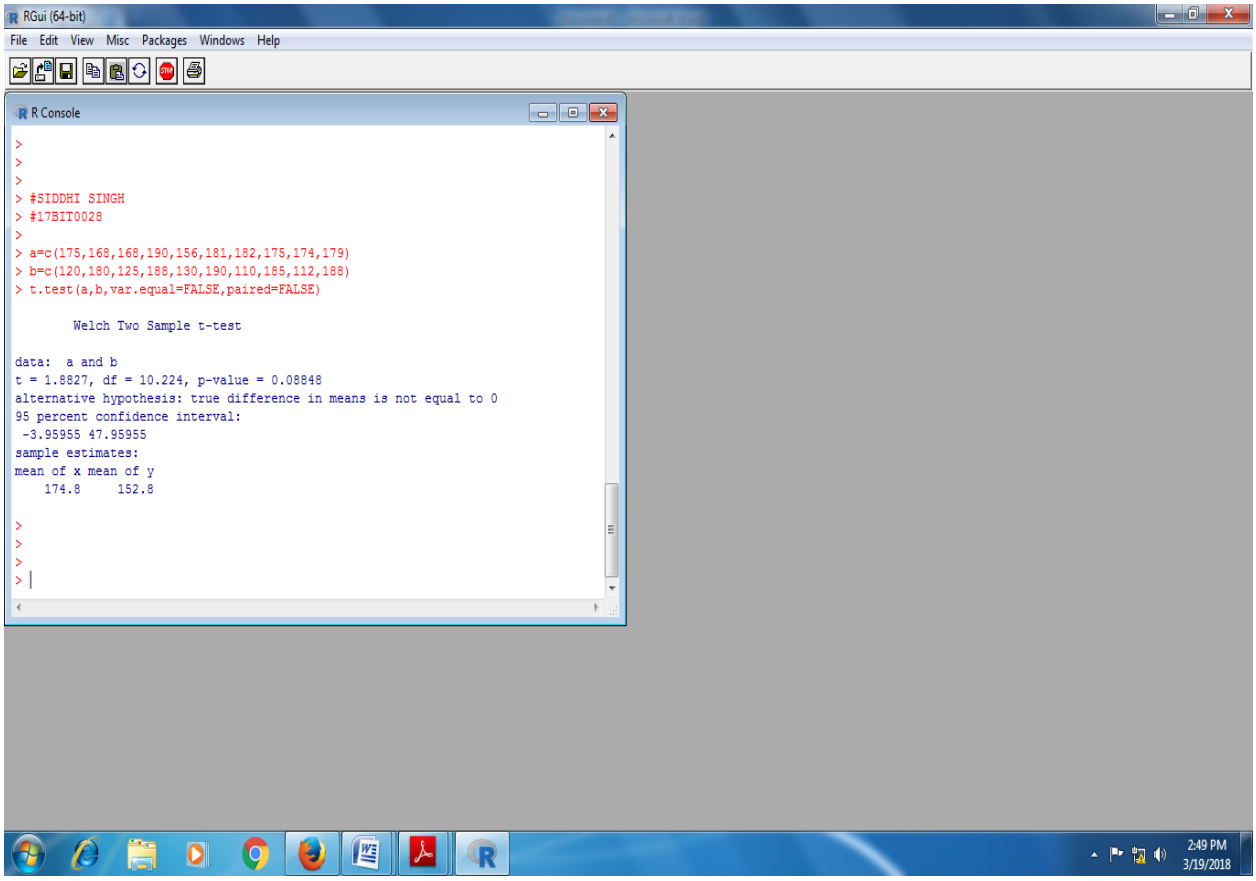
t.test usage:

Test a claim about $\mu_1 - \mu_2$ Below, mu is the value of $\mu_1 - \mu_2$ in the null hypothesis.

- Two-Tailed Test: t.test(x, y, mu = ,)
- Right-Tailed Test: t.test(x, y, mu= , alternative="greater")
- Left-Tailed Test: t.test(x, y, mu= ,alternative="less")

Problem 3: Comparing two independent sample means, taken from two populations with unknown variance.The following data shows the heights of individuals of two different countries with unknown population variances. Is there any significant difference b/n the average heights of two groups.

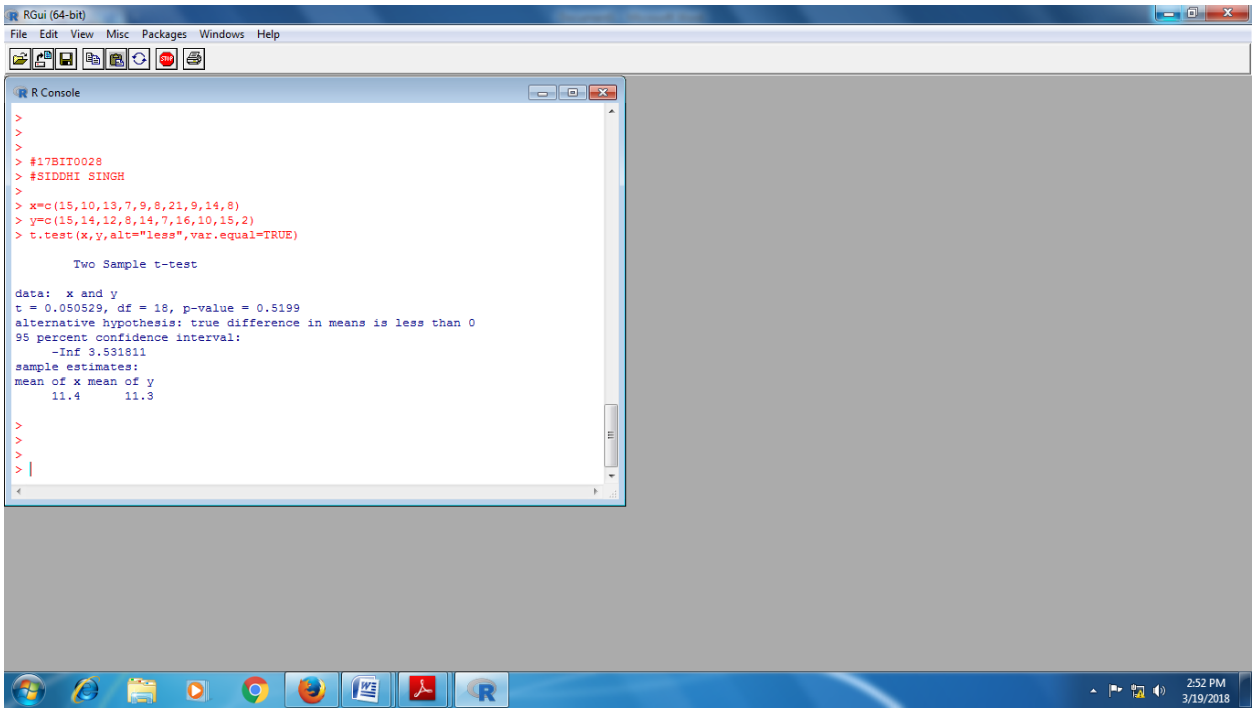
A:	175	168	168	190	156	181	182	175	174	179
B:	185	169	173	173	188	186	175	174	179	180



Problem 4: Suppose the recovery time for patients taking a new drug is measured (in days). A placebo group is also used to avoid the placebo effect. The data are as follows

with drug	: 15 10 13 7 9 8 21 9 14 8
placebo	: 15 14 12 8 14 7 16 10 15 2

Is there any significant difference between the average effect of these two drugs?

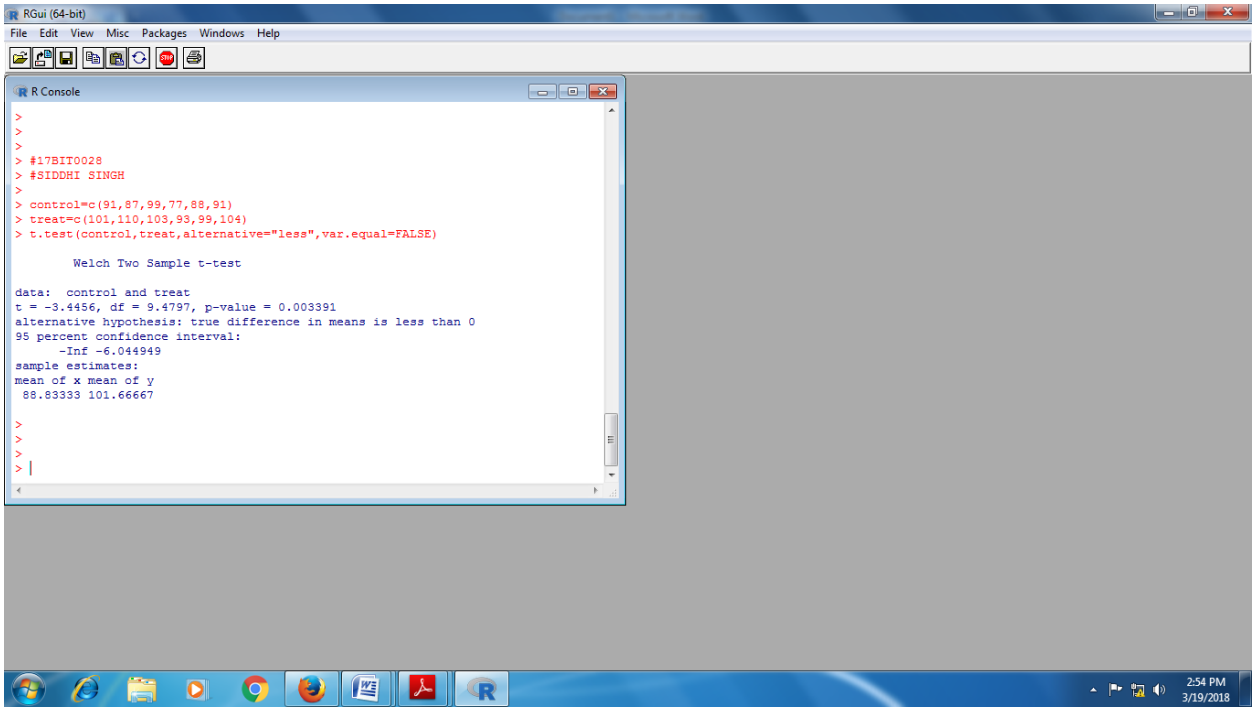


Inference :-

P value(0.3002) > 0.05 then there is no evidence to reject our Null hypothesis.

Problem 5: Six subjects were given a drug (trearment group) and an additional 6 subjects a placebo(control group).Their reaction time to stimulus was measured(in ms).We want to perform a two sample t-test for comparing the means of the treatment and control groups.

Control	**91**	**87**	**99**	**77**	**88**	**91**
Treatment	**101**	**110**	**103**	**93**	**99**	**104**



From both the output we see that the p-value = 0.003136(equal) and 0.003391(Unequal). Therefore, it infers that there is different between treatment and control group.

LAB-10

lab 10 18/3/18 -A

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```
> x = c(0.593, 0.142, 0.329, 0.691, 0.231, 0.793,
      0.519, 0.392, 0.418)
> t.test(x, alternative = "greater", mu = 0.3)
```

```
> a = c(65, 78, 88, 55, 48, 95, 66, 57, 79, 81)
> t.test(a, mu = 75)
```

```
> a = c(175, 168, 168, 190, 156, 181, 182, 175, 174,
      179)
> b = c(120, 180, 125, 188, 130, 190, 110, 185, 112,
      188)
> t.test(a, b, var.equal = FALSE, paired = FALSE)
```

```
> x = c(15, 10, 13, 7, 9, 8, 21, 9, 14, 8)
> y = c(15, 14, 12, 8, 14, 7, 16, 10, 13, 2)
> t.test(x, y, alt = "less", var.equal = TRUE)
```

```
> control = c(91, 87, 99, 77, 88, 91)
> treat = c(101, 110, 103, 93, 99, 104)
> t.test(control, treat, alternative = "less", var.equal = FALSE)
```