Scilab Assignment 1

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B.Sc. Physics (H) II year

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Section 1 : Scilab as Calculator

Question 1

Code:

```
// Bajrang 363
// S1Q1 Define the variables a = 15.62, b = -7.08, c = 62.5 and d = 0.5(ab-c)
// Evalute the following
// (a) a+ (a*b(a+d)^2)/ c*sqrt(abs(a*b))
// (b) d*exp(d/2) + ((a*d+c*d)/(20/a+30/b))/a+b+c+d

a = 15.62;
b = -7.08;
c = 62.5;
d = 0.5*(a*b-c)

sol1 = a + (a*b*((a+d)^2))/(c*sqrt(abs(a*b)));

disp("a+ (a*b*(a+d)^2)/ c*sqrt(abs(a*b)) = ", sol1)

sol2 = d * exp(d/2) + ((a*d + c*d)/(20/a+20/b))/(a+b+c+d);

disp("d*exp(d/2) + ((a*d+c*d)/(20/a+30/b))/a+b+c+d = ", sol2)
```

Output:

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s1q1.sce', -1)

 "a+ (a*b*(a+d)^2)/ c*sqrt(abs(a*b)) = "

 -830.77554

 "d*exp(d/2) + ((a*d+c*d)/(20/a+30/b))/a+b+c+d = "

 -282.33418
```

Question 2

Code:

```
// Bajrang 363
// S1Q2 Calculate
// (cos(5*%pi/6))^2*(sin(7*%pi/8)**2)+ (tan(((%pi)/6)*log(8))/sqrt(7)
// (3**7*log(76))/7**3+546 + (910)**(1/3)

sol1 = (cos(5*%pi/6))^2*(sin((7*%pi/8)**2)) + (tan(((%pi)/6)*log(8))/sqrt(7))

disp("cos(5*%pi/6))^2*(sin((7*%pi/8)**2)) + (tan(((%pi)/6)*log(8))/sqrt(7) = ", sol1)

sol2 = ((3^7)*log10(76))/(7^3+546) + (910)^(1/3)
disp("((3^7)*log10(76))/(7^3+546) + (910)^(1/3)  =  ", sol2)
```

Output:

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s1q2.sce', -1)

 "cos(5*%pi/6))^2*(sin((7*%pi/8)**2)) + (tan(((%pi)/6)*log(8))/sqrt(7) =  "

   1.4395045

 "((3^7)*log10(76))/(7^3+546) + (910)^(1/3) =  "

   14.317449
```

Question 3

Code

```
// Bajrang 363
// Section 1 Question 3

v = 350;

r = ((3*v)/(4*%pi))^(1/3);
disp("Radius is = ", r)
```

```
s = 4*%pi*(r^2);
disp("Surface Area is = ", s)
```

Output

```
-> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s1q3.sce', -1)
 "Radius is = "
  4.3717952
 "Surface Area is = "
  240.17593
```

Section 2

Question 1-5

Code

```
// Bajrang 363
// Section 2
// Creating and Handling Arrays

// Creating row vector A
A = [32, 4, 81, exp(2.5), 63, cos(%pi/3), 14.12];
disp("Row vector A is ", A)

// Sum of all elements in A
S = sum(A)
disp("Sum of all elements of A is ", S)

// Row vector with the first element is 1 and last element is 33 with increment of 2
r = [1:2:33]
disp("Row vector with the first element is 1 and last element is 33 with increment
of 2 ", r)
```

```
// Row vector with 15 equally spaced elements b/w 7 and 40
er = [linspace(7,40,15)]
disp("Row vector with 15 equally spaced elements b/w 7 and 40", er)

// Row vector with 12 equally spaced elements b/w -1 and -15
p = [linspace(-1,-15,12)]
disp("Row vector with 12 equally spaced elements b/w -1 and -15 ", p)
```

Output

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s2.sce', -1)
 "Row vector A is "
  32.   4.   81.   12.182494   63.   0.5   14.12
 "Sum of all elements of A is "
  206.80249
 "Row vector with the first element is 1 and last element is 33 with increment of 2 "
     column 1 to 16
  1.  3.  5.  7.  9.  11.  13.  15.  17.  19.  21.  23.  25.  27.  29.  31.
     column 17
  33.
 "Row vector with 15 equally spaced elements b/w 7 and 40"
     column 1 to 8
  7.  9.3571429  11.714286  14.071429  16.428571  18.785714  21.142857  23.5
     column 9 to 15
  25.857143  28.214286  30.571429  32.928571  35.285714  37.642857  40.


 "Row vector with 12 equally spaced elements b/w -1 and -15 "
     column 1 to 8
 -1.  -2.2727273  -3.5454545  -4.8181818  -6.0909091  -7.3636364  -8.6363636  -9.9090909
```

column 9 to 12

-11.181818 -12.454545 -13.727273 -15.

Question 6

Code

```
// Bajrang 363
// Section 2 Question 6

// part(a)
A = zeros(2,5)
disp("A = ", A)

// part(b)
B = eye(4,4)
disp("B = ", B)

// part(c)
C = ones(3,2)
disp("C = ", C)
```

Output

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s2q6.sce', -1)
 "A = "
  0.  0.  0.  0.  0.
  0.  0.  0.  0.  0.


 "B = "
  1.  0.  0.  0.
  0.  1.  0.  0.
```

```
   0.   0.   1.   0.

   0.   0.   0.   1.


 "C = "

   1.   1.

   1.   1.

   1.   1.
```

Question 7

Code

```
// Bajrang 363
// Section 2 Question 7

A = [6, 43, 2, 11, 87; 12, 6, 34, 0, 5; 34, 18, 7, 41, 9];
disp("A = ", A)

// part A
va = A(2,:)
disp("va = ", va)

// part B
vb = A(:,4)
disp("vb = ", vb)

// part C
vc = [A(1,:),A(2,:)]
disp("vc = ", vc)

// part D
vd = [A(:,2)',A(:,5)']
disp("vd = ", vd)
```

Output

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s2q7.sce', -1)


 "A = "

  6.    43.   2.    11.   87.

  12.   6.    34.   0.    5.

  34.   18.   7.    41.   9.


 "va = "

  12.   6.   34.   0.   5.


 "vb = "

  11.

  0.

  41.


 "vc = "

  6.   43.   2.   11.   87.   12.   6.   34.   0.   5.


 "vd = "

  43.   6.   18.   87.   5.   9.
```

Question 8

Code

```
// Bajrang 363
// Section 2 Question 8

A = [1,2,3,4,5,6,7; 2,4,6,8,10,12,14; 21,18,15,12,9,6,3; 5,10,15,20,25,30,35];
disp("A = ", A)

// Part A
B = [A(1,1), A(1,3), A(1,5), A(1,7); A(3,1), A(3,3), A(3,5), A(3,7); A(4,1),
A(4,3), A(4,5), A(4,7)]
disp("B = ", B)

// part B
u = [A(3,:), A(:,5)', A(:,7)']
disp("u = ", u)

// part C
D = diag(A)
disp("D = " , D)

disp("Sum of diagonal elements = ", sum(D))

// Part D
S = size(A)
disp("S = ", S)

// Part E
A1 = matrix(A, [2,14])
disp("A1 = ", A1)

A2 = matrix(A, [14,2])
disp("A2 = ", A2)

P = A1*A2;
disp("A1*A2 = P = ", P)
```

Output

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s2q8.sce', -1)
 "A = "
  1.    2.    3.    4.    5.    6.    7.
  2.    4.    6.    8.    10.   12.   14.
  21.   18.   15.   12.   9.    6.    3.
  5.    10.   15.   20.   25.   30.   35.

 "B = "
  1.    3.    5.    7.
  21.   15.   9.    3.
  5.    15.   25.   35.

 "u = "
  21.   18.   15.   12.   9.   6.   3.   5.   10.   9.   25.   7.   14.   3.   35.

 "D = "
  1.
  4.
  15.
  20.

 "Sum of diagonal elements = "
  40.
 "S = "
```

4. 7.

"A1 = "

1. 21. 2. 18. 3. 15. 4. 12. 5. 9. 6. 6. 7. 3.

2. 5. 4. 10. 6. 15. 8. 20. 10. 25. 12. 30. 14. 35.

"A2 = "

1. 12.

2. 20.

21. 5.

5. 10.

2. 9.

4. 25.

18. 6.

10. 12.

3. 6.

6. 30.

15. 7.

15. 14.

4. 3.

8. 35.

"A1*A2 = P = "

734. 1744.

1708. 3542.

Question 9

Code

```
// Bajrang 363
// Question 9

V = [zeros(2,5); ones(2,5)]
disp("V = ", V)
```

Output

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s2q9.sce', -1)


 "V = "


  0.  0.  0.  0.  0.

  0.  0.  0.  0.  0.

  1.  1.  1.  1.  1.

  1.  1.  1.  1.  1.
```

Question 10

Code

```
// Bajrang 363
// Section 2 Question 10

for i=1:6
    for j = 1:6
        U(i,j) = 0;
        if (i==3|i==4|j==3|j==4)
            U(i,j) = 1;
        end
    end
end

disp("U = ", U)
```

Output

```
--> exec('C:\Users\kaila\OneDrive\Desktop\Bahubali\Assignment\s2q10.sce', -1)


 "U = "

  0.  0.  1.  1.  0.  0.

  0.  0.  1.  1.  0.  0.

  1.  1.  1.  1.  1.  1.

  1.  1.  1.  1.  1.  1.

  0.  0.  1.  1.  0.  0.

  0.  0.  1.  1.  0.  0.
```

Thank You