Submission Guidelines:

Download & extract the tar file "rollno_lab7.tar.gz" and rename it to <YourRollNo>_lab7.
Use the same folder structure for this assignment.

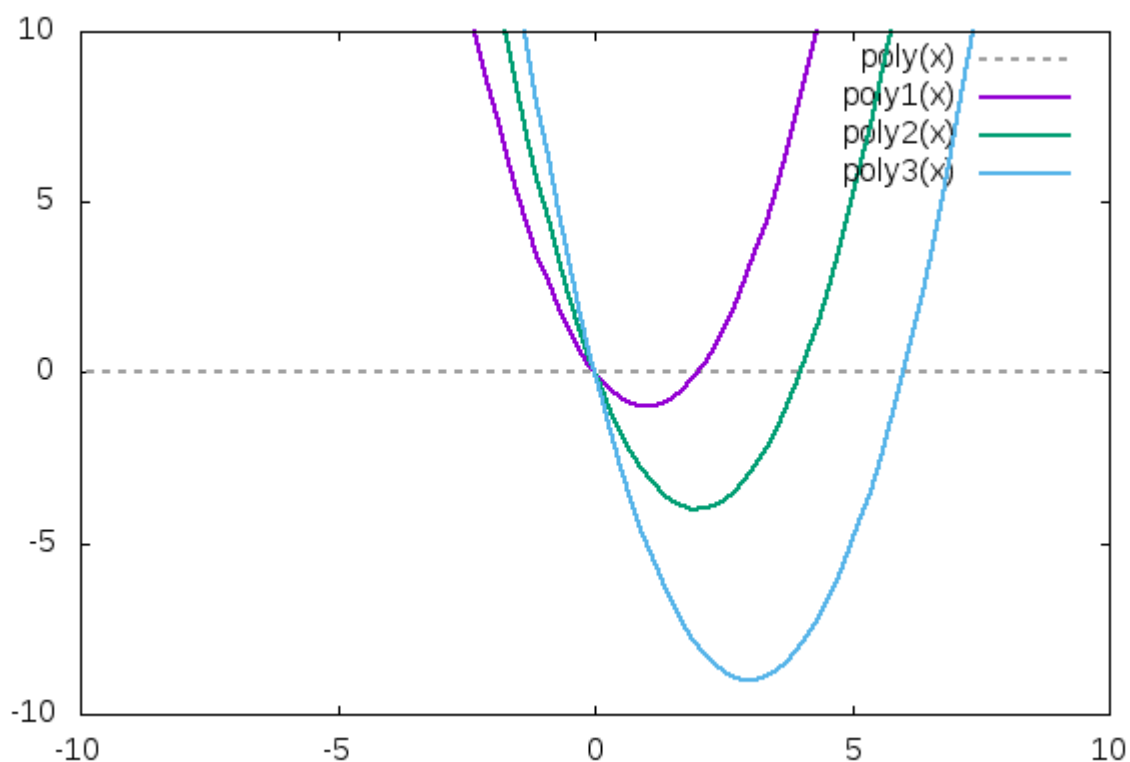File to be submitted: <YourRollNo>_lab7.tar.gz

Please follow the upload guidelines properly. Refer to demos given in the class. They will surve you as starting points for the respective problems.

Gnuplot

Problem1: Identify and plot the four polynomial functions as shown in the figure below.
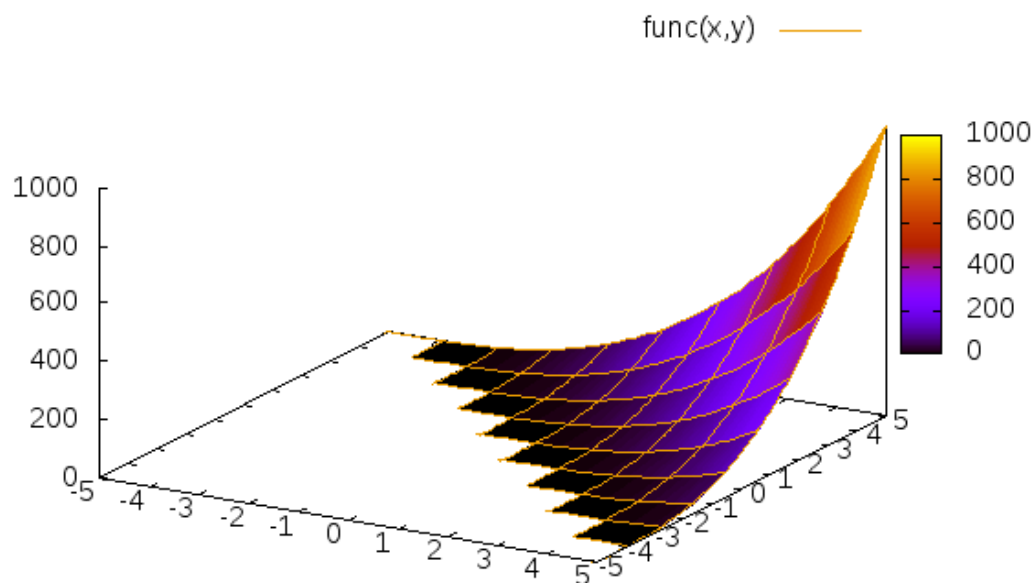
What to submit?
> 1.plot, 1.png

Problem2: Identify the function and create a 3D plot of the function as shown in the figure below.
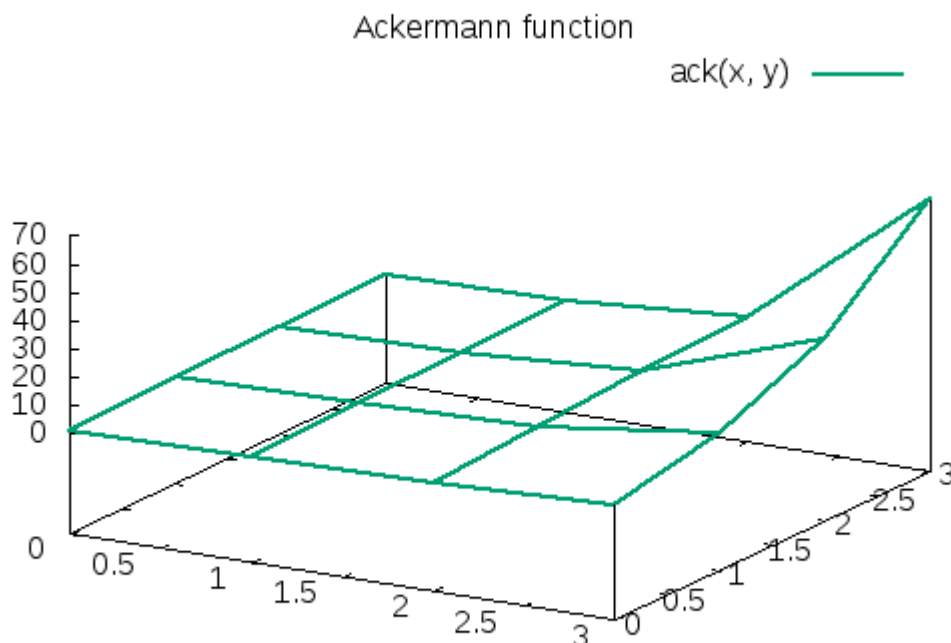
What to submit?
  2.plot, 2.png

func(x,y)

Problem3: Create plot for Ackermann recursive function as shown in the figure below.

$$A(m,n) = \begin{cases} n+1 & \text{if } m = 0 \\ A(m-1, 1) & \text{if } m > 0 \text{ and } n = 0 \\ A(m-1, A(m, n-1)) & \text{if } m > 0 \text{ and } n > 0. \end{cases}$$
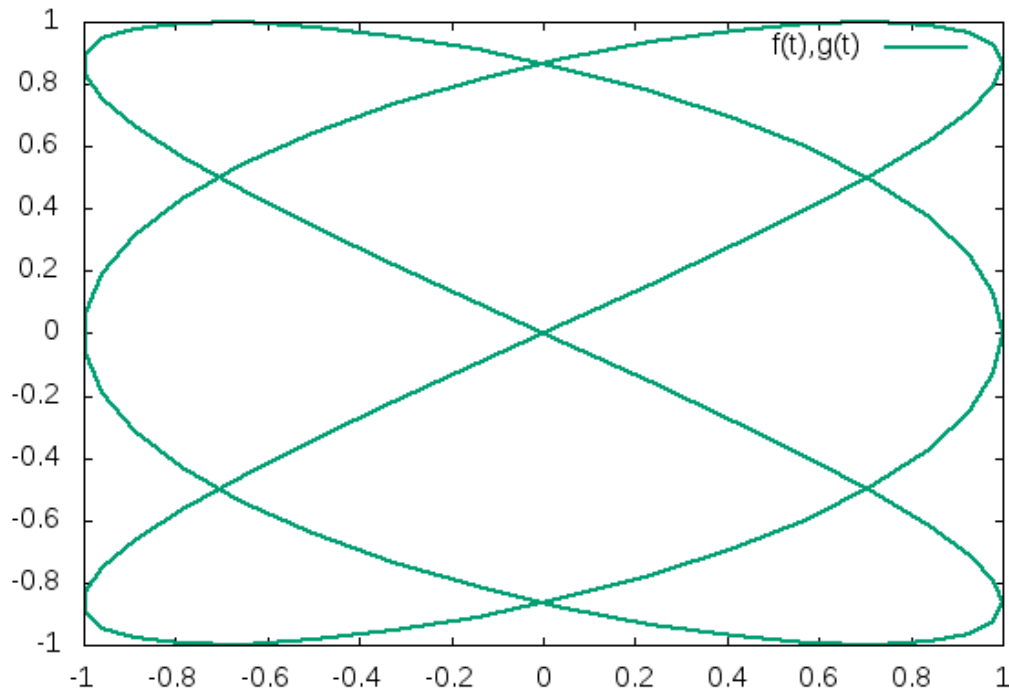
What to submit?
  3.plot, 3.png

Ackermann function

ack(x, y)

Problem4: Plot the parametric equations as shown in the figure below using parametric equations
f(t)=cos(3*t) & g(t)=sin(2*t).
Create two more beautiful plots using parametric equations of your own.

What to submit?
  4_1.plot, 4_1.png, 4_2.plot, 4_2.png, 4_3.plot, 4_3.png

Problem5: You are a given datafile "inputdata5" with 2 clolumns: Rollno & Marks, seperated by space . Determine the grade of the student using 'Gradepoint Calculator' given below and plot the Rollno Vs Gradepoint graph with gridlines.

Rollno will be on X-axis and Grade will be Y-axis.
The marks should be displayed at the top of each grade as shown in the sample output.
Output should contain gridlines.
Use the sample input provided in file "inputdata5".
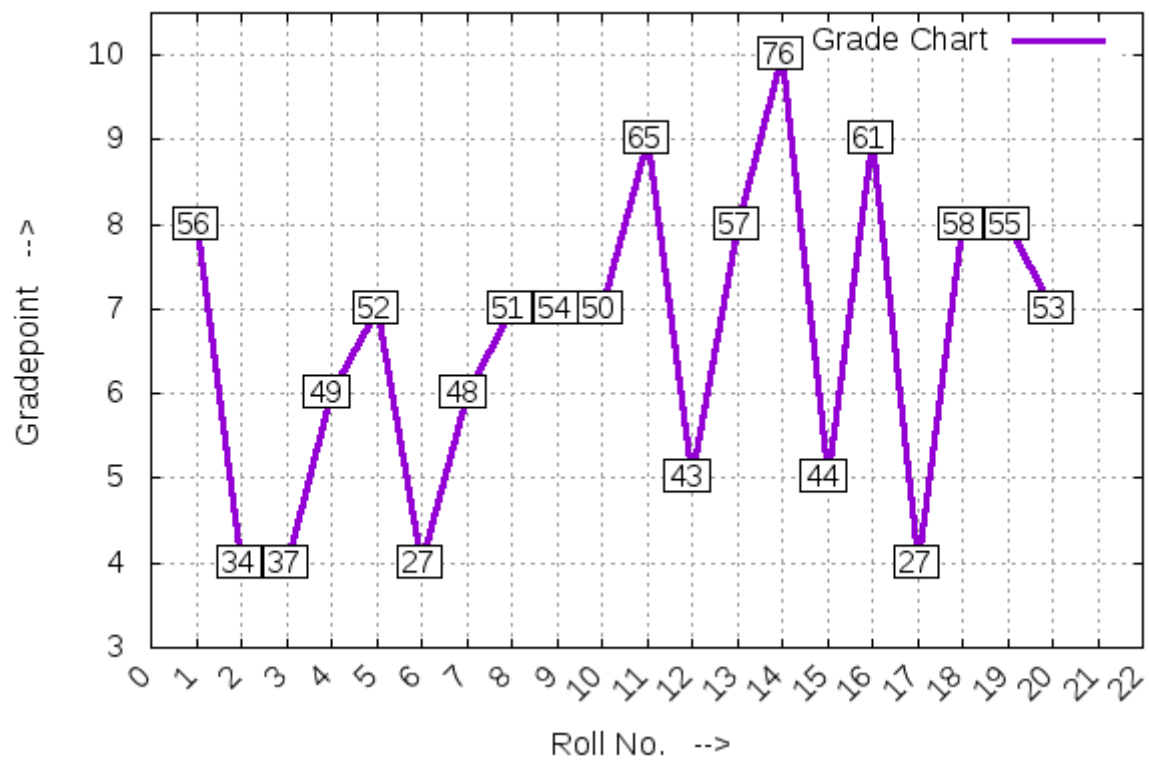
What to submit?
  5.plot, 5.png

Gradepoint Calculator: M denotes marks

Marks Range	Grade
M<=39	4
40<=M<=44	5
45<=M<=49	6
50<=M<=54	7
55<=M<=59	8
60<=M<=69	9
70<=M	10

Sample Input:

Roll	Marks
1	56
2	34
3	37
4	49
5	52
6	27
7	48
8	51
9	54
10	50
11	65
12	43
13	57
14	76
15	44
16	61
17	27
18	58
19	55
20	53

Sample Output Figure:

Problem6: You are given an input file "inputdata6" that contains subject names. Each line in the file contain one subject name. Use script (awk/sed/bash etc) to calculate the frequency of each subject. Plot a histogram graph of Subject Vs frequency of the subject.

Subject names will be on X-axis and frequency will be the Y-axis.
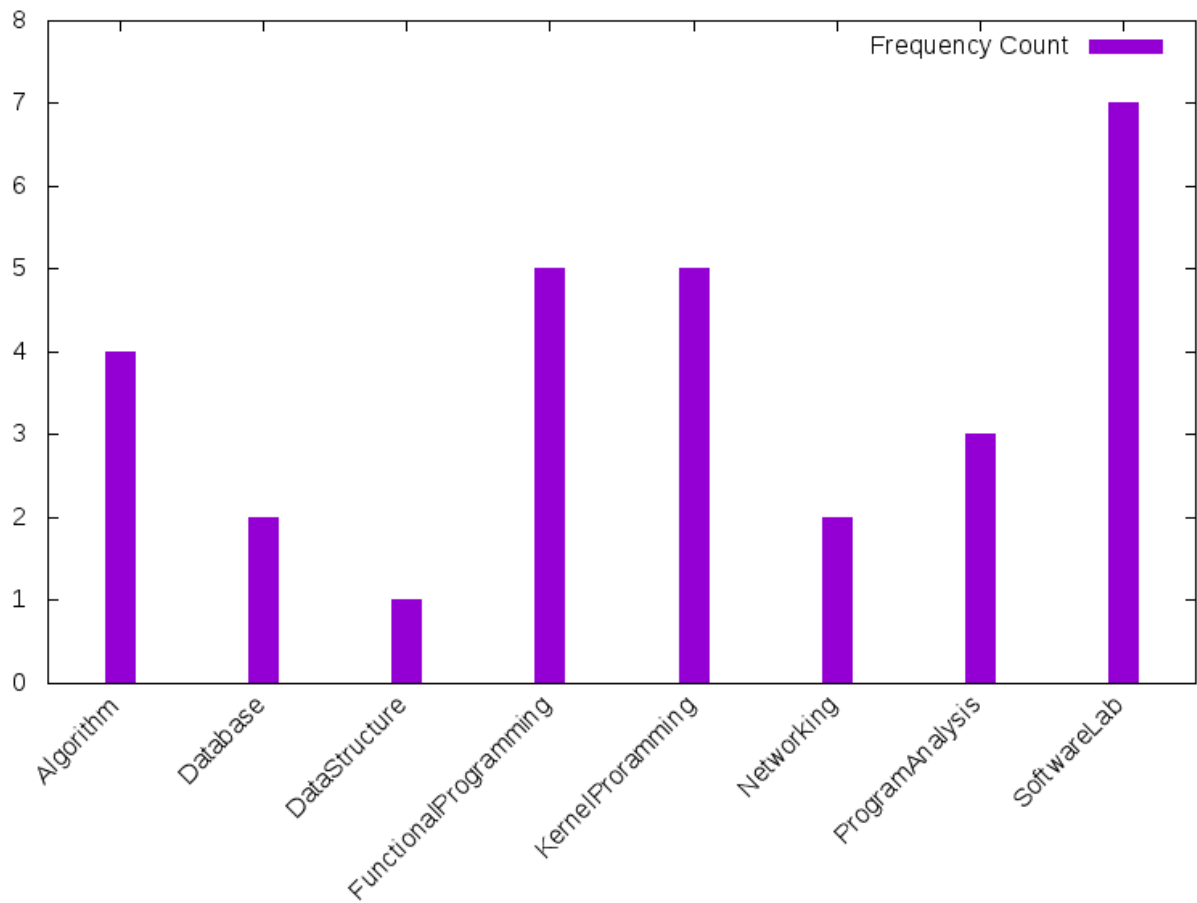
What to submit?
  6.plot, 6.png, 6.sh/6.awk

Sample Input:

Subjects
DataStructure
Algorithm
SoftwareLab
KernelProramming
Networking
ProgramAnalysis
Algorithm
Database
KernelProramming
FunctionalProgramming
SoftwareLab
Networking
Database
KernelProramming
ProgramAnalysis
SoftwareLab
FunctionalProgramming
SoftwareLab
KernelProramming
Algorithm
SoftwareLab
Algorithm
ProgramAnalysis
SoftwareLab
FunctionalProgramming
SoftwareLab
FunctionalProgramming
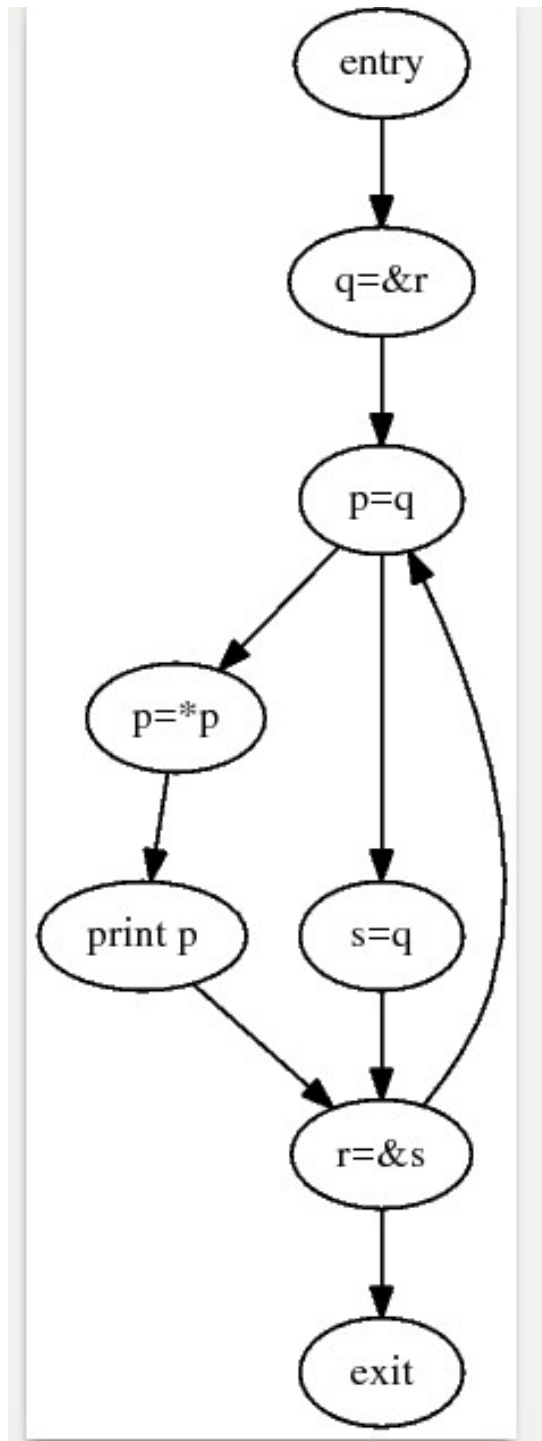KernelProramming
FunctionalProgramming

Sample Output:

Graphviz & Dot

Problem7: Create one program excution flow diagram using dot file structure to cretae pdf similar to the figure shown below.
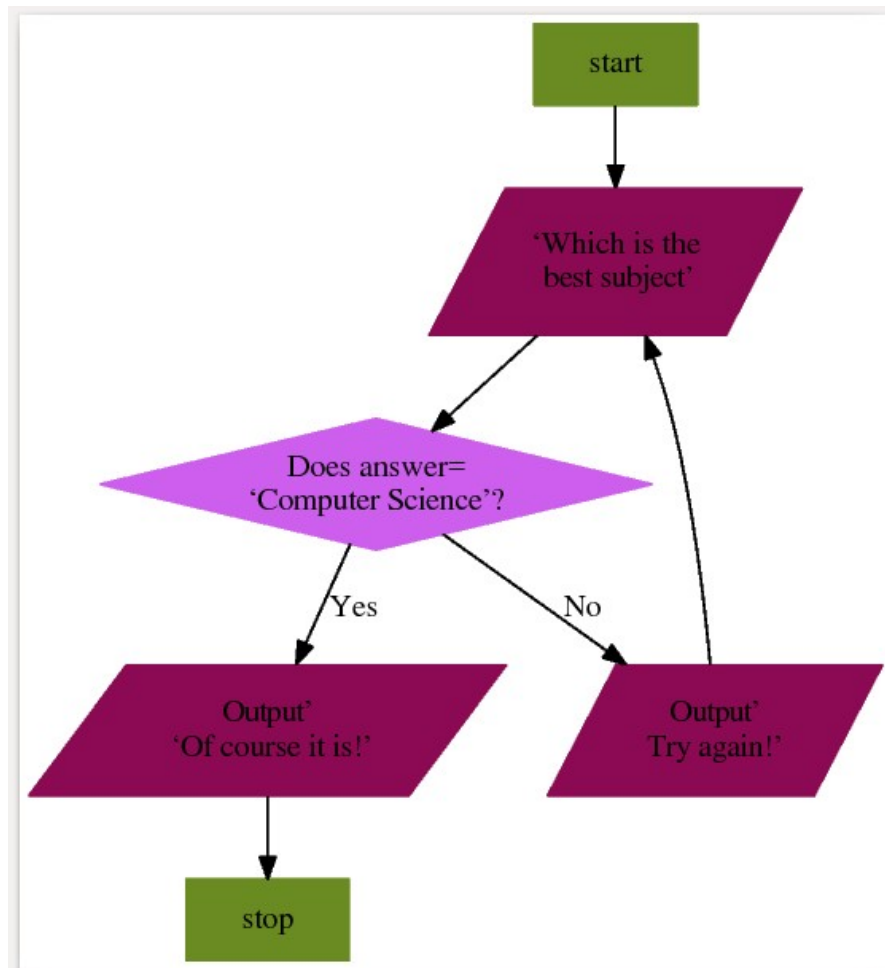
What to submit?
  7.dot, 7.pdf

Problem8: Create a flowchart using dot file structure to create a figure shown below in pdf form.
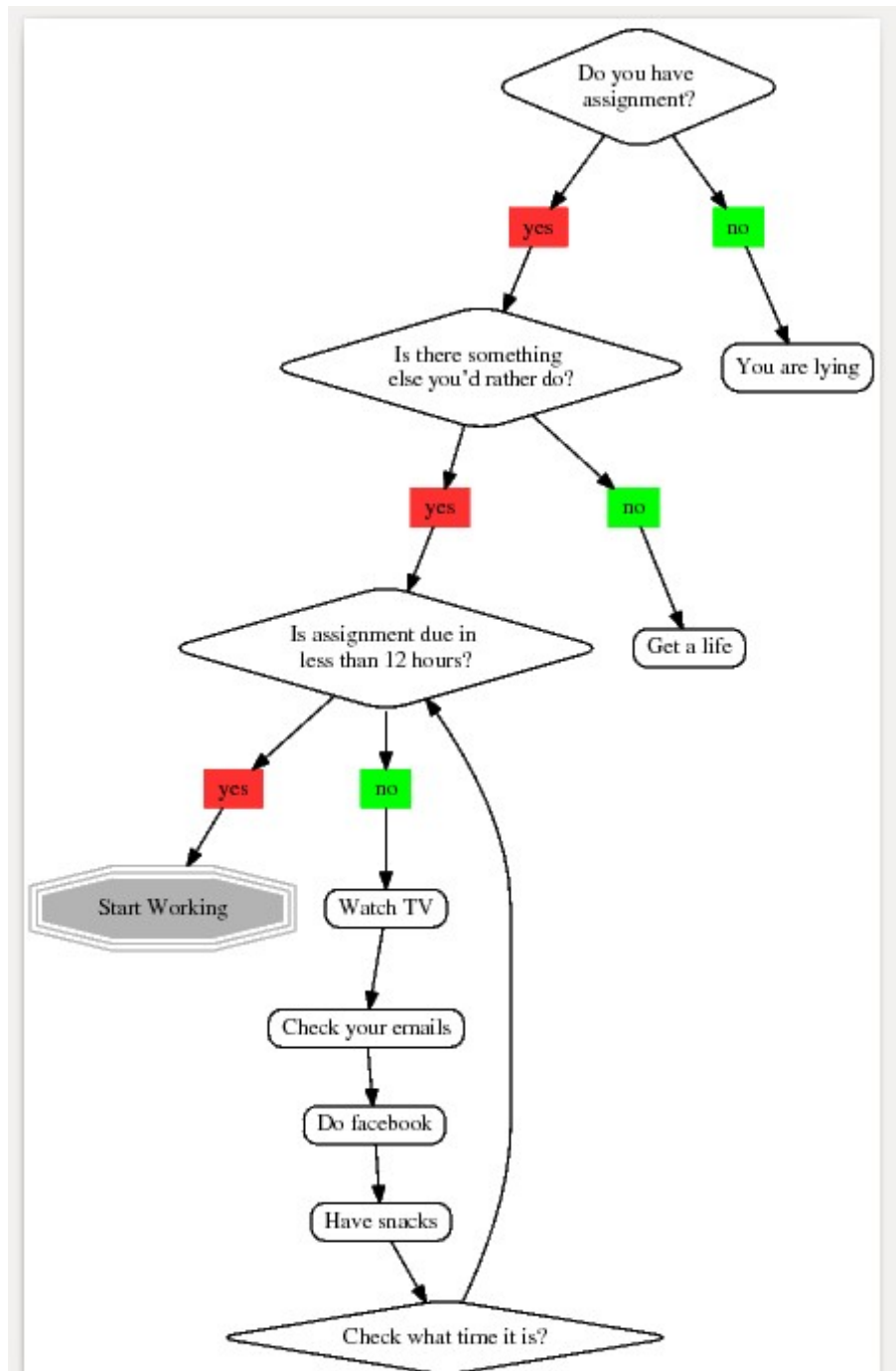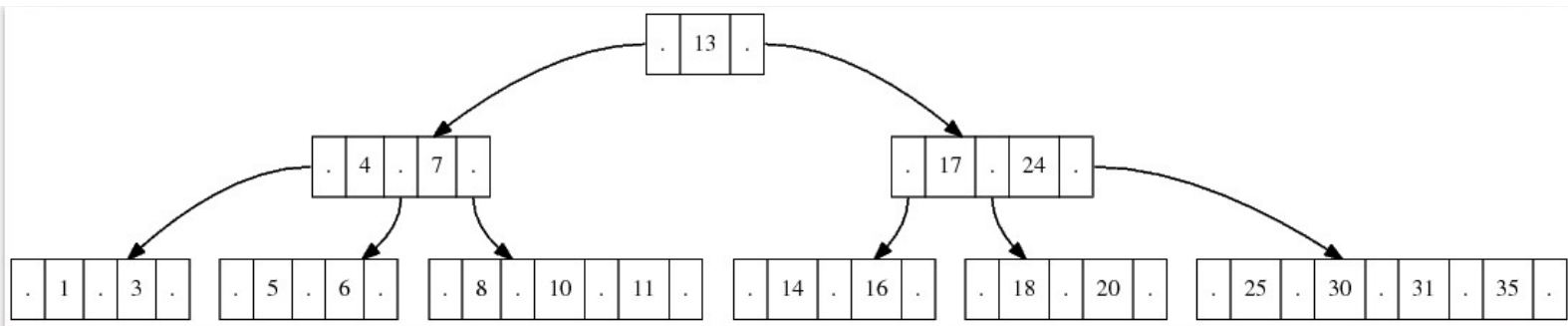
What to submit?
        8.dot, 8.pdf

Problem9: Create a pdf flowchart shown below using dot file structure.

What to submit?
    9.dot, 9.pdf

Problem10: Create one btree figure shown below using dot file structure.

What to submit?
    10.dot, 10.pdf

Problem11: An input file "inputdata11" has been given to you. The file contains nodes and edges of a graph. Use the input file to create its graph as shown below. You need to process the inputfile using awk script and then generate the dot file from the output of awk.

Sample Input: nodes={1,2,3,4,5,6,7,8}

            edges={(1,2,6.2) (1,3,2.1) (2,4,1.8) (2,3,3.4) (2,5,4.6) (3,4,1.5) (5,6,6.3) (6,7,4.9)
            (5,4,9.0) (5,5,1.7) (3,8,3) (1,3,6.2) (4,7,1.1)}
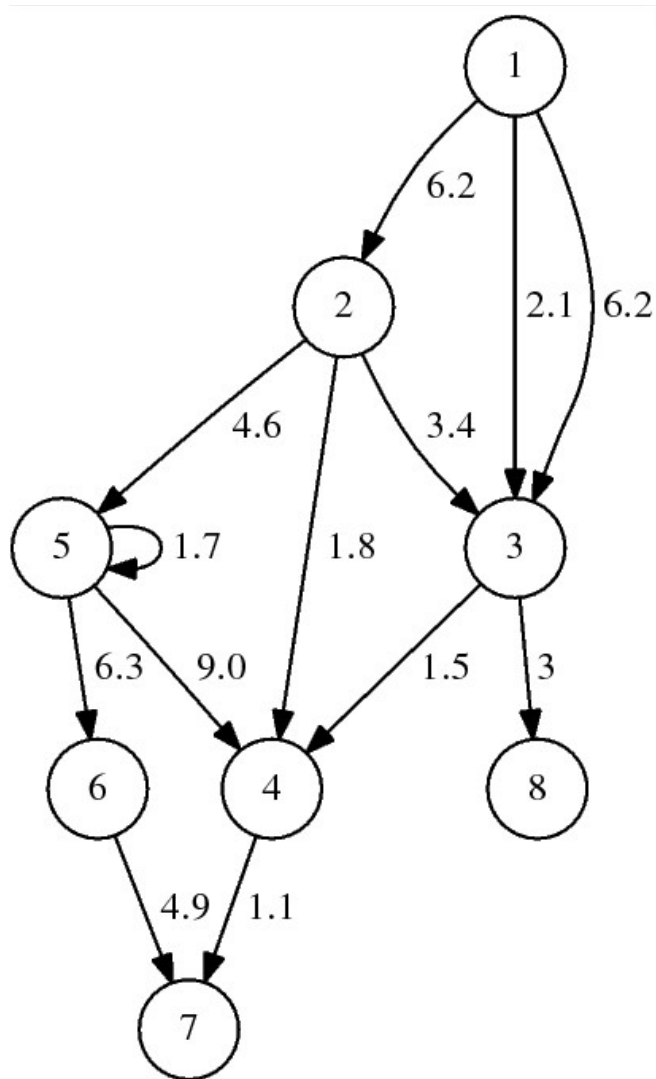
 where (v1, v2, w) denotes edge v1->v2 of weight w.

What to submit?

      11.dot, 11.pdf, 11.awk

We will use the following commands :

                awk -f 11.awk inputdata11 > 11.dot
                dot -Tpdf 11.dot -o 11.pdf

Problem12: Create one finite automaton (dfa/nfa) using the input datafile "inputdata12". You need to process the inputfile using bash/awk script and generate the dot file. Sample output is shown below.

What to submit?
      12.dot, 12.pdf, 12.awk/12.sh

Sample Input file:
          ab|gh|cd*e|bd+f

Sample Output: