# Homework 1 (Chapter 3) - Due 17th Sep, 2017

## Data Structures and Algorithm Analysis in C++

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# Contents

# 1 Basics

## 1.1 Enumerate with alphabet

(a) $\Theta(n)$

(b) $\Theta(n \log n)$

(c) $\Theta(n^2)$

## 1.2 Inline code

1. `verb` effect: `while (true) i++;`

2. `texttt` effect: `while (true) i++;`

3. `texttt` with <u>underline</u> command: <u>while</u> `(true) i++;`

4. `lstinline` effect: `while (true) i++;`

5. `lstinline` with `highlight` option: `while (true) i++;`

## 1.3 Code block

1. Code block effect:

   ```cpp
   // This is an in—file code block
   #include <iostream>

   int main()
   {
       std::cout << "Hello, World!\n";
       return 0;
   }
   ```

2. Code file effect:

   ```cpp
   // This code is from an outer file
   #include <iostream>

   int main()
   {
       std::cout << "Hello, World!\n";
       return 0;
   }
   ```
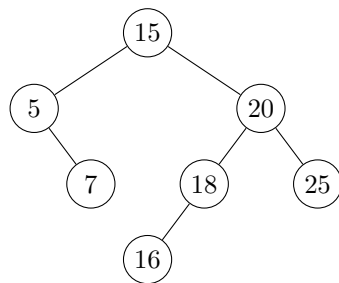
3. More settings example:

```python
1  try:
2      num = int(input(msg))
3      passed = True
4  except ValueError as e:
5      print("Please input a number")
```
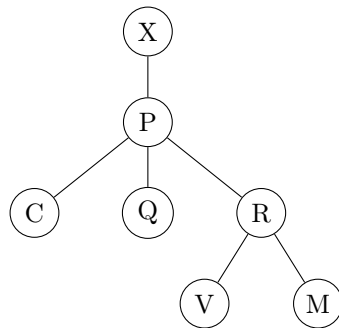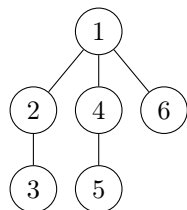
# 2  Trees
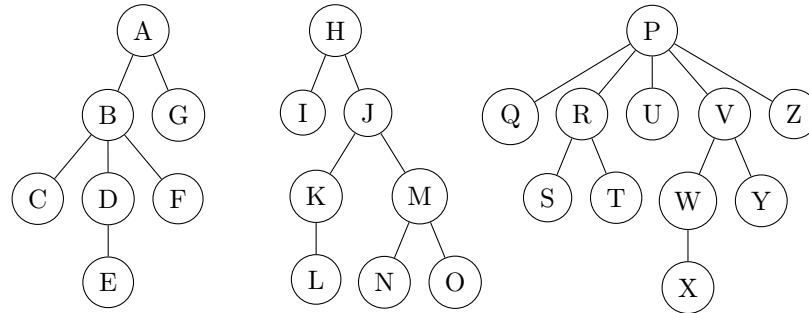
## 2.1  Binary tree



## 2.2  Normal tree

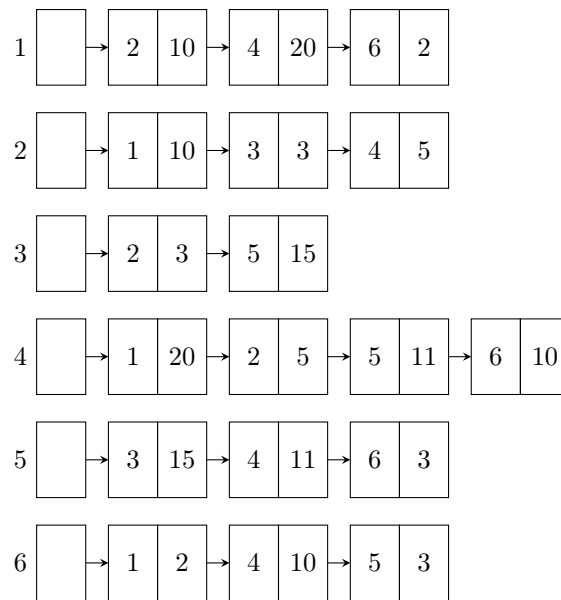### 2.2.1  With tikz package



### 2.2.2  With forest package

## 2.3 Forest



# 3 More

## 3.1 Linked list

## 3.2   Bplus tree

```
                         ┌───┬───┬───┐
                         │ I │ M │ S │
                         └───┴───┴───┘
        ┌──────────────────┘   │   └──────────────┐
  ┌───┬───┐          ┌───┐      ┌───┐              ┌───┐
  │ D │ G │          │ K │      │ P │              │ U │
  └───┴───┘          └───┘      └───┘              └───┘
┌──┬──┬──┐ ┌──┬──┐ ┌──┬──┐ ┌──┬──┐ ┌──┬──┐ ┌──┬──┐  ┌──┬──┐ ┌──┬──┐ ┌──┬──┐
│A │B │C │ │D │E │ │G │H │ │I │J │ │K │L │ │M │N │O│ │P │R │ │S │T │ │U │W │
└──┴──┴──┘ └──┴──┘ └──┴──┘ └──┴──┘ └──┴──┘ └──┴──┴─┘ └──┴──┘ └──┴──┘ └──┴──┘
```