

Notes of Business Statistics.

Sampling.

Sampling is a process in which the fixed numbers of observation are taken randomly from a larger population. (Sampling is the process of selecting the sample from the population)

Sampling means selecting the group that you will actually collect data from in your research.

for example:- for taking decision about to purchase or not to purchase the fruits, a fruit merchant inspects randomly only a few of them rather than examining each and every fruit.

Objective:- The important objective of sampling is to obtain maximum information of the population under study ~~by~~ using ^{minimum} of money, labour, time.

* Meaning of Sample and Population:-

Population:- A Population is the entire group that you want to draw conclusions about.

→ The "Population" in statistics include all members of a defined group that we are studying or collecting inf. for data-driven decisions.

Population can be classified as follows:-

(i) finite Population:- The finite population is also known as a countable population in which the population can be counted.

Example:- Employees of a company.

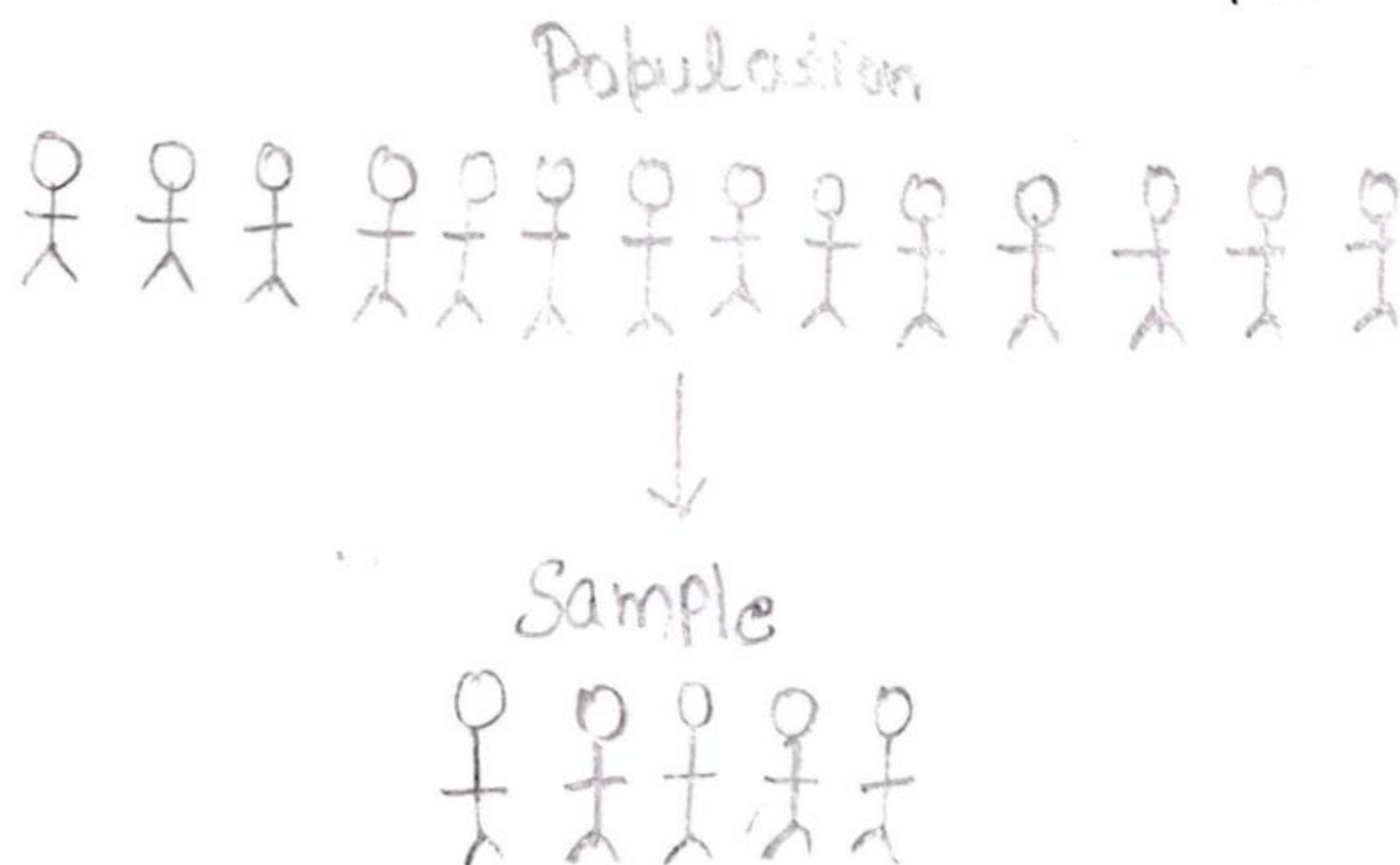
(ii) Infinite Population:- The infinite population is also known as uncountable population, in which the counting of units in the population is not possible.

Example:- The number of germs in the patient's body is uncountable.

(2) Sample:- A sample is the specific group that you will collect data from.

→ The size of the sample is always less than the total size of the population.

Example:- All the students in the class are population whereas the top 10 students in the class are the sample.



Parameters and Statistics.

Parameter:- A Parameter is a characteristic of a population.

- A parameter is a number describing a whole population (e.g. population mean).
- It is a measure of characteristic of an entire population (a mass of all units under consideration that share common characteristics) based on all the elements within that population.
- for example:- all people living in one city.
OR all students in classroom.

Statistics:- A statistic is a characteristic of a sample, a portion of a target population.

The statistic is a known number and a variable which depends on the portion of a population.

Statistics are numbers, that summarize data from a sample, that is some subset of entire population.

Descriptive and Inferential Statistics.

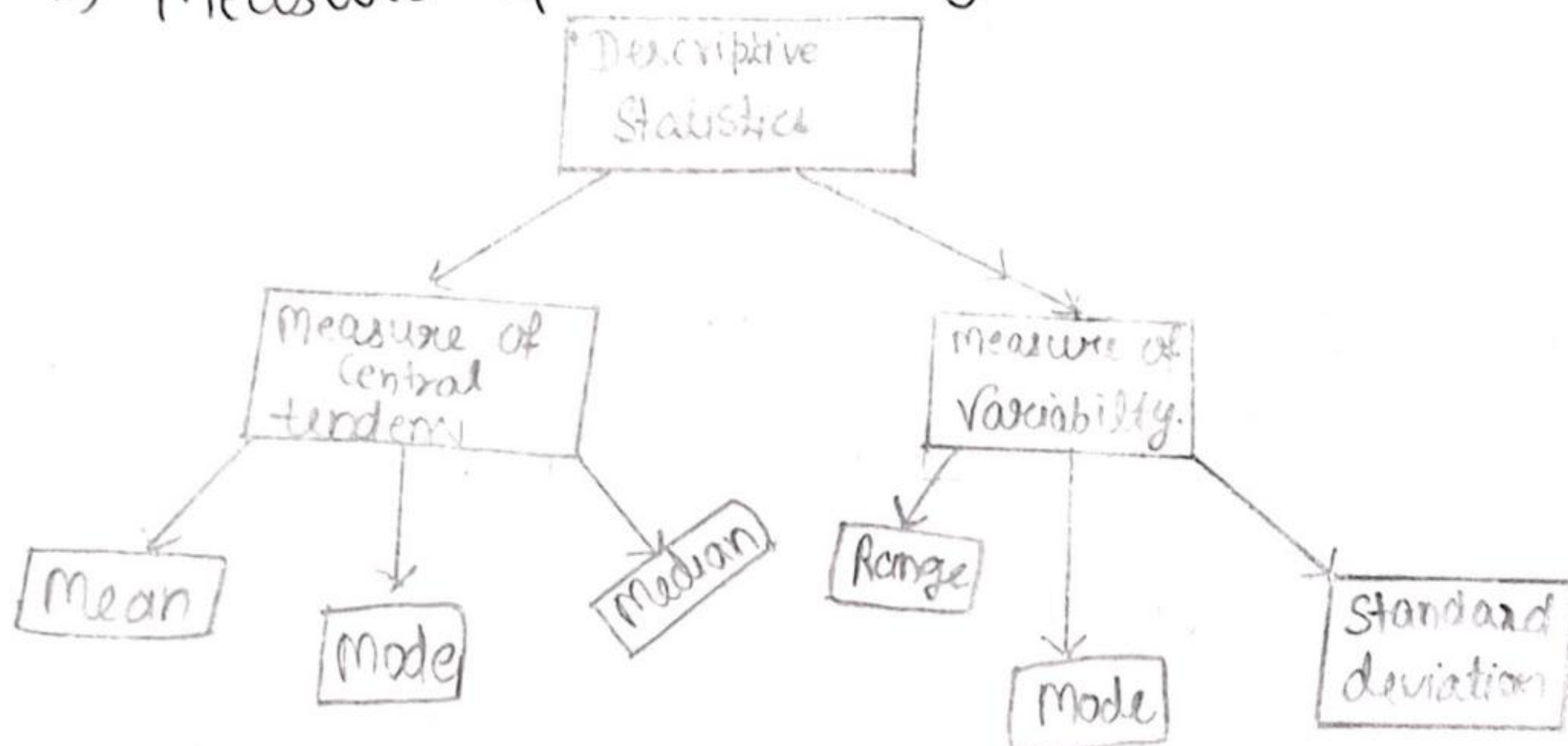
Descriptive Statistics.

- It describe the important characteristics of the data, It is a simple way to describe our data.
- Descriptive statistics is very important to present our raw data in meaning-ful way using numerical calculations or graphs or tables.
- Descriptive Statistics give information that describes the data in some manner.
- for example:- let, a pet shop sells cats, dogs, birds, and fish. If 100 pets are sold and 40 out of the 100 were dogs, then the description of the data on the pets sold would be that 40% were dogs.

Types of Descriptive Statistics:-

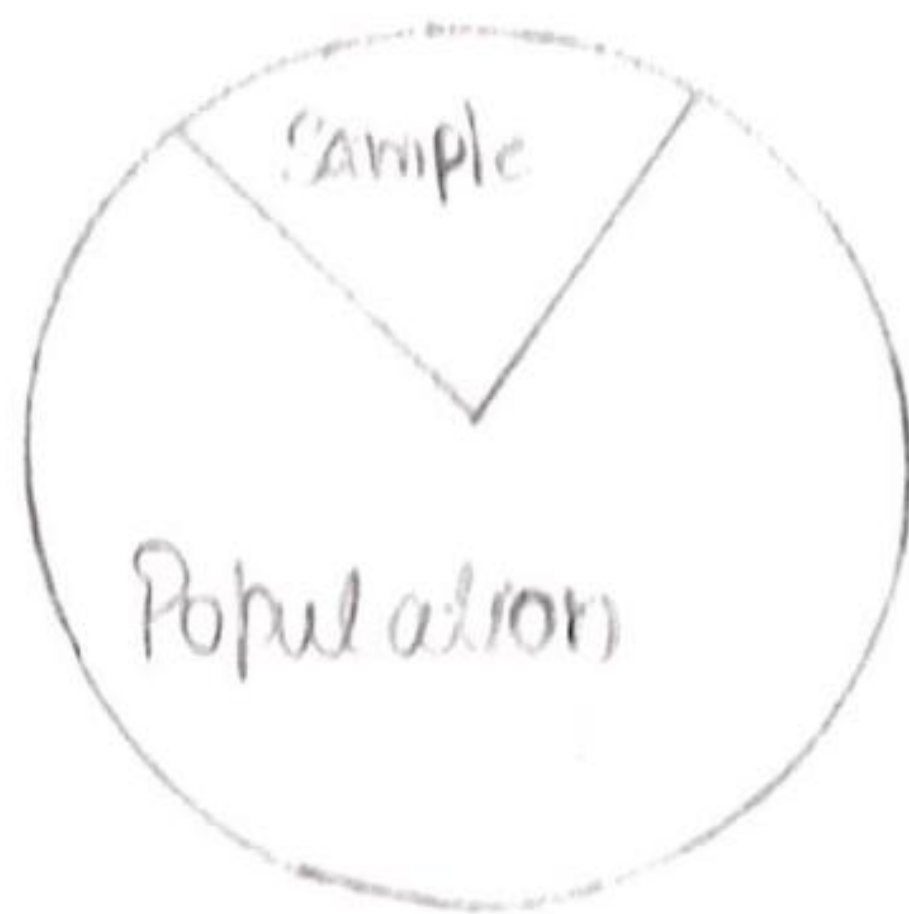
→ Measure of Central Tendency.

→ Measure of Variability



Inferential Statistics

- Inferential statistics make inferences about populations using data drawn from the population
- In this, predictions are made by taking any group of data in which you are interested.
- It can be defined as defined as a random sample of data taken from a population to make inference about the population.
- It basically allows ^{you} to make predictions by taking a small sample instead of working on whole population.



⇒ Probability distributions
⇒ Correlation testing and regression analysis
are fall under the category of Inferential Statistics

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* Difference between Descriptive and Inferential Statistics.

Descriptive Statistics	Inferential Statistics
1. It gives information about raw data which describes the data in some manner.	It makes inference about population using data drawn from the population.
2. It is used to describe a situation.	It is used to explain the chance of occurrence of event.
3. It can be achieved with the help of charts, graphs, tables etc.	It can be achieved by Probability.
4. It helps in organizing, analyzing and to present data in a meaningful manner.	It allows us to compare data, and make predictions.
5. Final results are shown in form of charts, tables and graphs.	Final results result is the Probability Scores.

Types of Sampling

There are two types of sampling:-

(i) Probability Sampling.

(ii) Non-probability Sampling.

(i) Probability Sampling:- It involves random selection.

→ It uses random sampling techniques to create a sample.

→ In Principal, every element of the population has the same chance at being included in the sample.

(ii) Non-probability Sampling:- The sample is selected based on non-random criteria, and not every member of the Population has a chance of being included.

→ It use non-random process.

* Probability Sampling Methods.

(i) Simple Random Sample

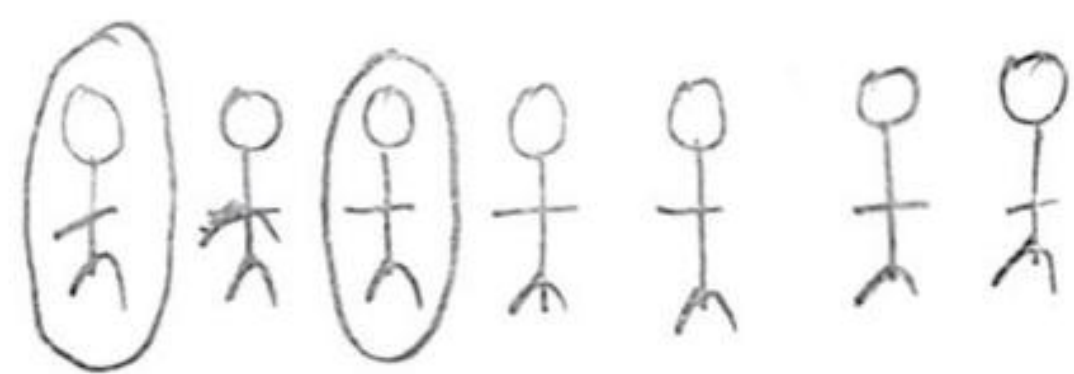
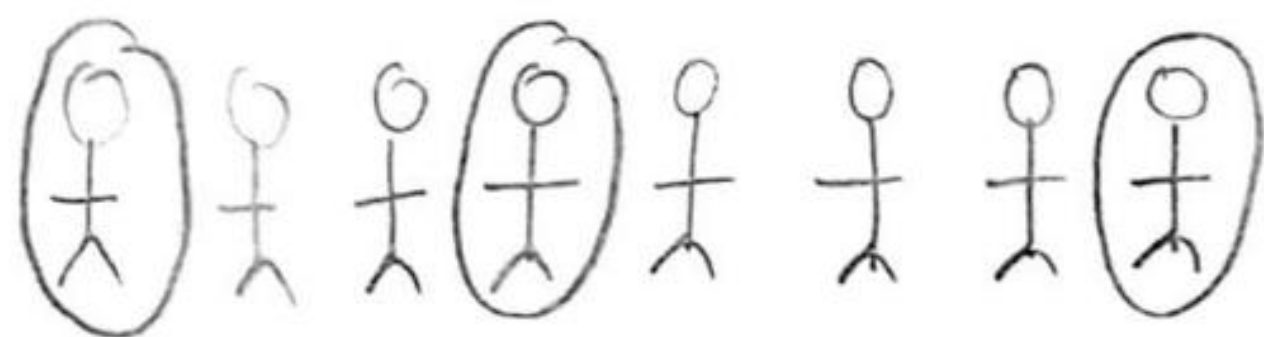
(ii) Systematic Sample

(iii) Stratified Sample.

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(i) Simple random sampling :-

- In this, every member of the population has an equal chance of being selected.
- For this type of sampling, you can use tools like random number generators.
- Example:- you want to select a simple random sample of 100 employees of Company ABC. You assign a number to every employee in the company from 1 to 1000, and use a random generator to select 100 numbers.



Simple random Sampling

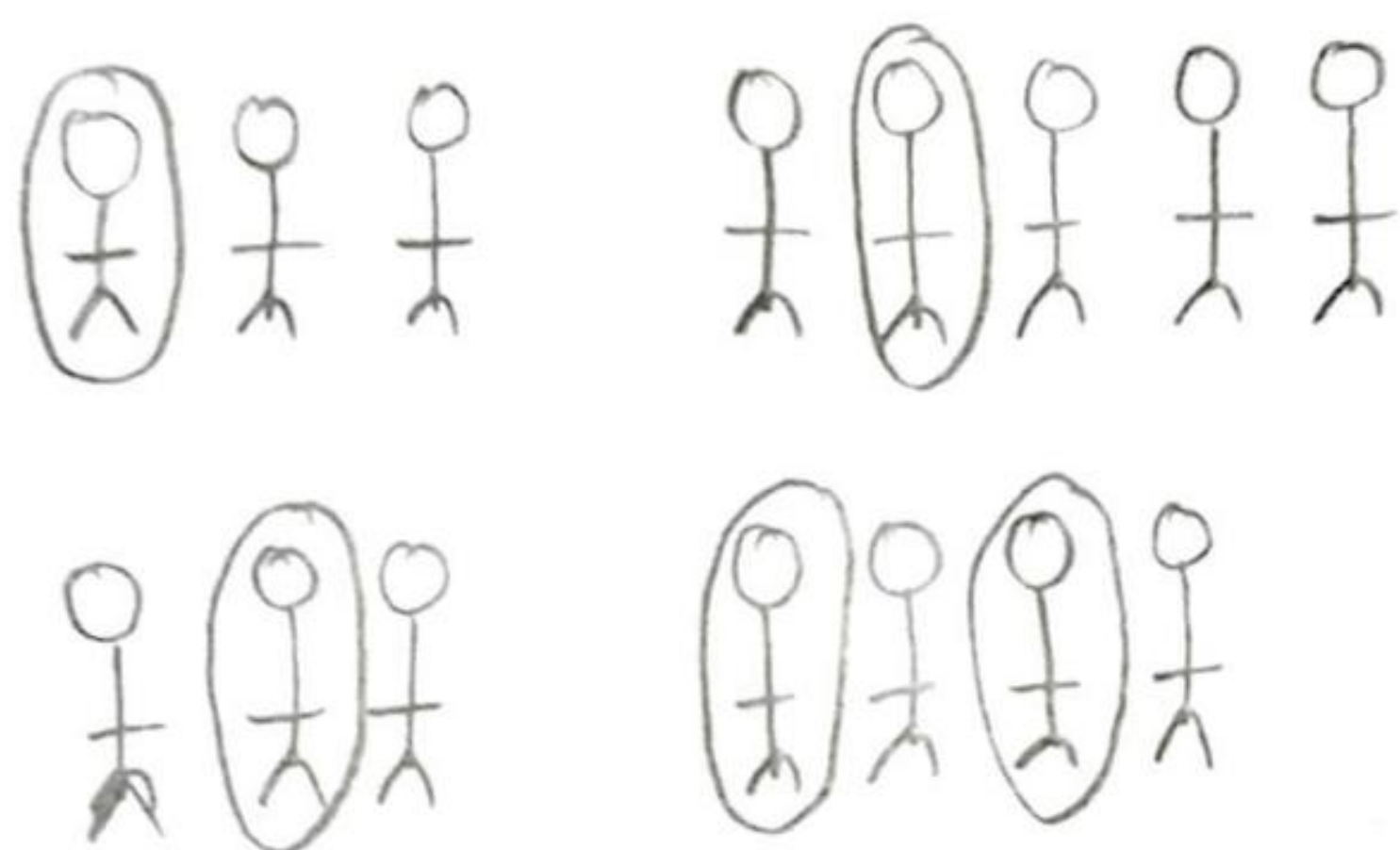
(ii) Systematic Sampling:-

- It is similar to simple random sampling but it is easier to conduct.
- In this, every member of the population is listed with a number, but instead of randomly generating numbers, individuals are chosen at regular intervals.

Example:

The Company has 800 female employees and 200 male employees you want to the sample reflects the gender balance of the company.

So firstly sort the population into the two strata based on gender. , Then you use random sampling on each group, selecting 80 Women and 20 men which gives you a sample of 100 people.



Stratified Sample.

* Non - Probability Sampling Methods.

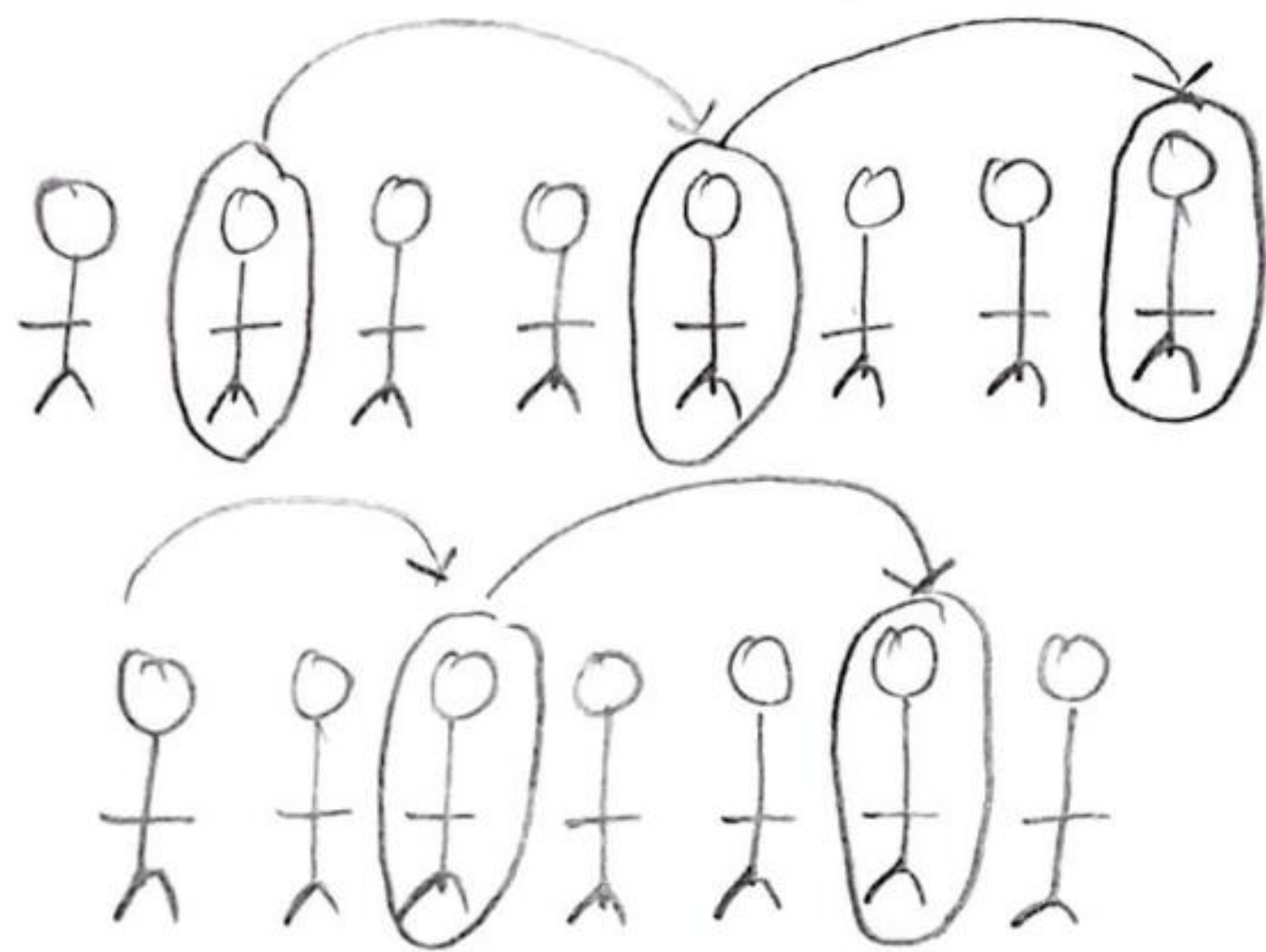
- (i) Convenience Sampling.
- (ii) Judgement Sampling.

(i) Convenience Sampling:-

This method is also known as chunk.

A chunk means part of population, which is selected according to convenience and not on basis of random sampling techniques.

Example:- All employees of the company, are listed in alphabetical order. From the first 10 numbers, you randomly select a starting point: number 5. From number 5 onwards, every 10th person on the list is selected (5, 15, 25, 35 and so on), and you end up with a sample of 100 people.



Systematic Sample

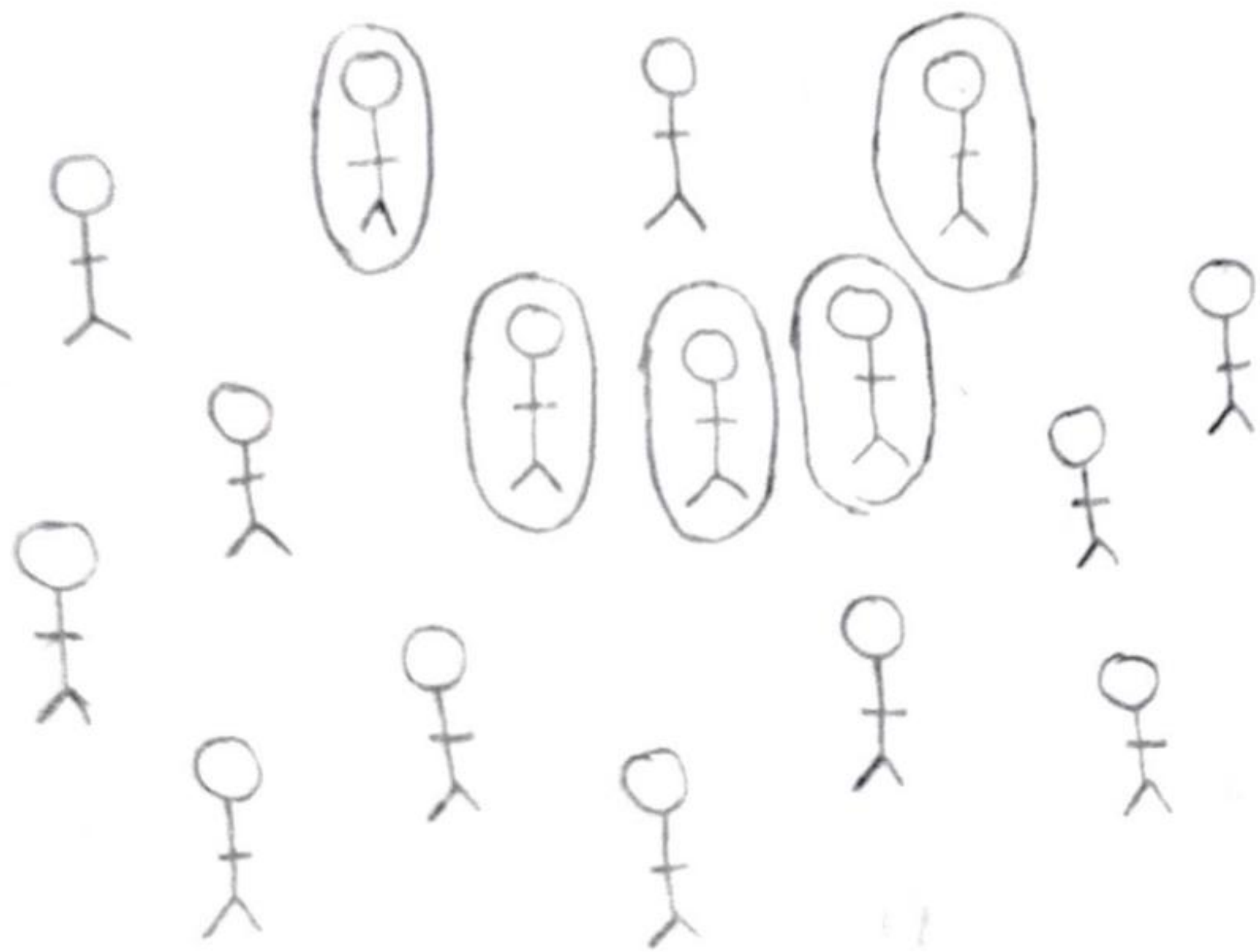
(3) Stratified Sampling:-

- Stratified Sampling involves dividing the population into sub-populations.
- To use this, sampling method: you divide the population into sub-groups (called strata).
(e.g. gender, age-range, job-role).
- Then you use random or systematic sampling to select a sample from each sub-group.

In this, Investigator is the important person.

He picks up the sample according to his own convenience.

Example: The tourists who come to a country for a short stay. They randomly meet the people who come in their way and try to collect information from them.



Advantages:

- (i) useful when source list is not available.
- (ii) when the population is not clearly defined.

Disadvantage:

- (i) samples selected according to convenience sampling are biased not reliable.

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(ii) Judgement Sampling:-

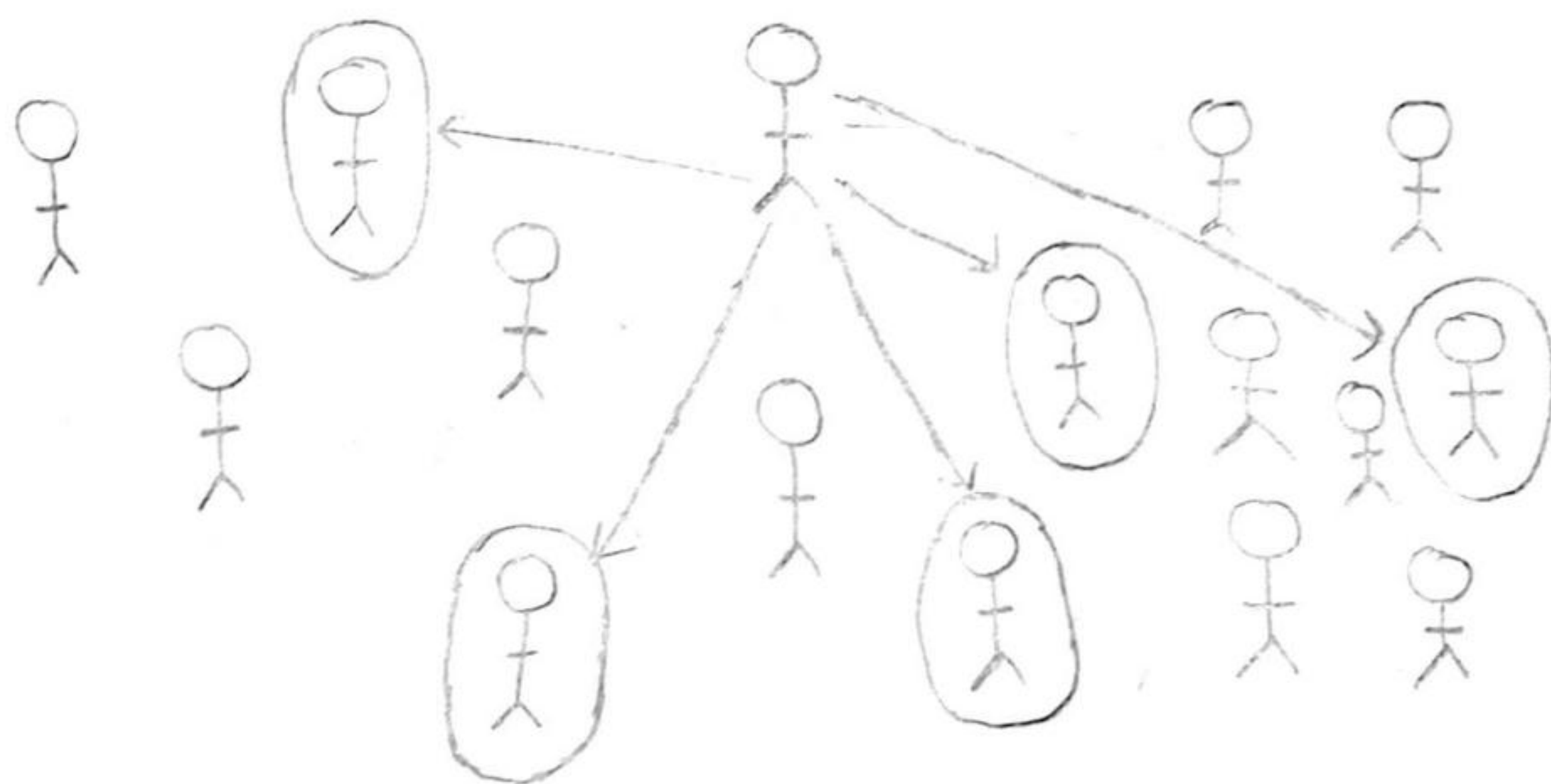
In this process sampling is done on the judgement of the investigator.

This method requires the deep knowledge of the population on the part of the investigator.

He selects the only those items which become part of sample.

It is also called the purposive sampling. (non-sampling technique).

The sample members are chosen on the basis of the researcher's knowledge and judgement
↑ investigator



⊗ Merits and Demerits of Sampling

Merits:-

- (i) Economical:- It is economical, because we have not to collect all data. Instead of getting data from 5000 farmers, we get it from 50-100 only.
- (ii) Less Time Consuming:- It is less time consuming because as no. of units, It is only a fraction of the total population.
- (iii) Reliable:- If sample is taken wisely, the results are very reliable and accurate.
- (iv) flexible:- When you collect data through sampling, you have a greater scope of flexibility.
- (v) Detailed Information:- In this, you can collect detailed information about the sample in the survey.

Demerits

- (i) Wrong Conclusion:- If the sample is not representative, the results will not be correct. These will lead to the wrong conclusions.

(ii) Small Population:-

Sometimes universe is so small that proper sample cannot be taken out of it.

(iii) Sampling Error:-

This method of sampling has many errors.

(iv) Personal Bias:-

In many cases, the investigator chooses samples, such as convenience method, chances of personal bias occurs.

(v) Experts Required

Experts are required to ensure the results of a sample investigation is satisfied.

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