DOWNLOAD PDF ANALYTICAL ELEMENTS OF MECHANISMS

Chapter 1 : Analytical Elements of Mechanisms : Malcolm J. Crocker :

Analytical Elements Of Mechanisms Causes of inequality: analytical strategies robert max, this guide serves to provide both a guided, extended reading list on analyzing social inequality (or stratification).

It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates. Existing test strips for glucose monitoring are available in a variety of packaging. Various embodiments of the present invention relate to an easy to use primary drum type container for blood glucose strips. In one embodiment, the drum type container may be used as a stand-alone container and dispensing system for test strips such that it is not mounted or otherwise associated with the blood glucose meter. Examples of drum type containers are provided in U. In other embodiments, the drum type container is mounted with a blood glucose meter, as discussed further below. With reference to FIGS. Container 10 may be described herein as containing and dispensing glucose test strips. However, the container might contain and dispense other analytical elements. Container 10 includes a casing 20 that defines an internal compartment The internal compartment 22 includes a plurality of compartment portions 36 each sized and configured to receive at least one analytical element 24, such as blood glucose test strips. Casing 20 is mounted to a base assembly A sliding dispenser mechanism 80 translates as indicated by arrow 81 to cause the container 10 to eject an analytical element 24 from a selected one of the portions 36 of compartment 22, such as shown in FIG. Casing 20 is rotatable on base assembly 60 about a longitudinal axis 28 of container 10, as indicated by arrow 12 of FIG. Housing 26 defines a central bore 34 centered along longitudinal axis 28 that extends between first end 30 and second end Bore 34 opens at least at second end As shown in FIG. Housing 26 defines internal compartment 22 for housing a number of analytical elements Compartment 22 may include a plurality of separate compartment portions 36 extending along the length of housing Each of compartment portions 36 opens at each of first and second ends 30, 32 of housing A separate analytical element 24 can be positioned in each of the compartment portions Only a few of compartment portions 36 are shown with an analytical element 24 in FIG. In one embodiment, each of the compartment portions 36 is connected to a respective desiccant chamber Each desiccant chamber 38 is in communication with it respective compartment portion 36 via an airway that extends between and opens in desiccant chamber 38 and compartment portion Each desiccant chamber 38 houses a desiccant to control moisture in the respective connected compartment portion 36 to preserve the integrity of the analytical element 24 housed in the compartment portion Other configurations for compartment portions 36 and desiccant chambers are within the ordinary skill in the art and are not elaborated upon here. Casing 20 also includes a first sealing member 40 connected at first end 30 of housing 26 and a second sealing member 42 connected at second end 32 of housing Sealing members 40, 42 provide a seal that prevents moisture and other containments from entering the compartment portions 36, and provide a hermetic seal to isolate the analytical elements 24 from the environment. In one embodiment, sealing members 40, 42 are made from sealable foil that is about 0. The sealable foil is applied to each end 30, 32 of housing 26 with analytical elements 24 in compartment portions Sealing members 40, 42 are sealed with the end wall portions of housing 26 located between and around compartment portions 36 so that each of the compartment portions is sealed individually and separately from the other compartment portions Thus, if one of sealing members 40, 42 is punctured at one of the compartment portions 36, the remaining compartment portions remain sealed from the environment by sealing members 40, Other embodiments contemplate other forms and materials for sealing members 40, For example, each of the compartment portions 36 can be provided with a separate lid, valve, or cap over its respective end openings. As discussed further below, housing 26 includes a number of detents 44 only a few of which are designated with reference numeral 44 in FIG. Detents 44 are spaced uniformly and radially about longitudinal axis 28 and in the illustrated embodiment are located adjacent to the circumferential edge of housing Each of the detents 44 is positioned between adjacent ones of respective compartment portions Detents 44 extend into and are recessed in the end surface of body 26 at second end 32 in the direction of longitudinal axis Base assembly 60 includes a cylindrical body 64 with a side wall 65 and end wall 67 that define a cavity As used herein, the term upper refers to the end or direction of base assembly 60 oriented toward casing 20, and not necessarily to the orientation of container 10 when held or used by the user. Side wall 65 extends from end wall 67 to an upper end 74 where cavity 66 opens. In one embodiment, a spindle 68 is centered in body 64 and extends in cavity 66 from end wall 67 to an outer end 72 that projects from upper end 74 of body Spindle 68 is sized for positioning in bore 34 of housing 26, and extends along longitudinal axis 28 of container 10 when housing 26 is positioned on spindle Housing 26 is rotatable about spindle 68 to align a selected one of compartment portions 36 with dispenser mechanism Spindle 68 includes a resilient or molded flange 70 extending therefrom adjacent to outer end Flange 70 flexes to permit placement of housing 26 about spindle 68 with lower end 32 of housing 26 and sealing member 42 adjacent to and supported by upper end 74 of body 64, as shown in FIGS. Flange 70 fictionally maintains the axial position of casing 20 relative to base assembly 60 yet permits removal when sufficient force is applied along longitudinal axis 28 to separate base assembly 60 and casing 20 by overcoming the resistance supplied by flange Referring now to FIGS. Side wall 65 of body 64 includes a slotted opening 78 also see FIGS. Dispenser mechanism 80 is mounted in and extends through slotted opening Dispenser mechanism 80 includes a plunger 82 in cavity 66 and an actuator 84 along body 64 outside cavity Actuator 84 and plunger 82 are linked to one another by a connector 86 extending through opening In other embodiments, actuator 84 is spring-biased to normally maintain plunger 82 in the retracted position shown in FIGS. Actuator 84 is readily accessibly by the user to move plunger 82 relative to body 64 toward and away from second end 32 of casing When it is desired to dispense an analytical element 24 from its respective compartment portion 36, the user slides or moves actuator 84 along slotted opening 78 toward casing 20, which in turn advances an upper end 88 of plunger 82 through sealing member 42 and into the aligned compartment portion 36 housing the desired analytical element Upper end 88 of plunger 82 engages the lower end of the analytical element 24 and pushes the upper end of the analytical element 24 through sealing member 40 at first end 30 of housing The analytical element 24 is produced out of its respective compartment portion 36 so it can be pulled from casing 20 by the user, as shown in FIG. Plunger 82 and the produced analytical element 24 only puncture the portions of sealing members 40, 42 sealing the compartment portion 36 in which the produced analytical element 24 was stored, while the remaining compartment portions 36 remain sealed by sealing members 40, 42 unless an analytical element was already produced therefrom. Locking mechanism 90 includes at least one locking member 92 housed in a receptacle 94 of body 64 located in a support member 69 in cavity Locking member 92 includes a base portion 96 and an upper portion Base portion 96 is captured in receptacle 94, and a biasing member in receptacle 94 normally biases locking member 92 outwardly so that upper extension 98 projects outwardly from upper end 74 of body In the locking position shown in FIG. The engagement between locking member 92 and detent 44 securely maintains the rotational positioning of casing 20 on base assembly 60 with plunger 82 aligned with one of the compartment portions 36 for subsequent ejection of an analytical element 24 via movement of actuator After removal of the analytical element 24, casing 20 can be rotated as indicated by arrow 12 in FIG. This rotational force and the rounded interface between detent 44 and locking member 92 pushes locking member 92 against spring and into receptacle 94, as shown in FIG. This allows rotation of casing 20 until the next adjacent detent 44 is aligned with locking member Spring then forces locking member 92 into the next aligned detent 44 and secures casing 20 in a rotationally selected position relative to base assembly 60 with plunger 82 aligned with the next adjacent compartment portion In one embodiment, it is contemplated that sealing member 42 is configured and sized relative to housing 26 so that detents 44 are not covered or obstructed by sealing member 42, such as shown in FIG. This allows direct contact between the material comprising housing 26 and locking member In another embodiment, it is contemplated that sealing member 42 is punctured or deformed by locking member 92 by the biasing force of spring so that locking member 92 is sufficiently received in detent 44 to maintain the selected rotational position. The dual locking members 92 associated with this embodiment of locking mechanism 90 simultaneously engage the respective detents 44 located on each side of the selected compartment portion 36 aligned with plunger The dual locking members 92 can increase resistance to rotation of casing 20 relative to base assembly 60 until sufficient rotational force is applied to overcome the resistance supplied by each locking member 92 and its respective biasing member Other embodiments contemplate more than two locking members are provided to engage more than two detents In yet other embodiment, locking mechanism 90 includes a single locking member By providing the interface of locking mechanism 90 with casing 20 on the end of casing 20, the overall profile of container 10 is minimized. Other than actuator 84, the moving parts of dispenser mechanism 80 and locking mechanism 90 are confined within container 10, minimizing the potential for damage or tampering. Other embodiments of container 10 contemplate arrangements where the locking mechanism 90 is not confined within container It is contemplated that locking members 92 include a spherical upper end to facilitate rotation of casing 20 when sufficient force is applied thereto to displace locking member 92 against the bias of spring when it is received in a detent In the illustrated embodiment, locking member 92 includes a cylindrical body extending between its upper portion 98 and base portion Other embodiments contemplate that base portion 96 and upper portion 98 form a sphere. Base portion 96 can be retained within receptacle 94 with a C-shaped retaining member, a lip, or other structure at the upper end of receptacle 94 to prevent passage of base portion 96 therethrough. In one embodiment, casing 20 is a disposable portion of container 10 and base assembly 60 is a reusable portion of container The user can initially purchase a container 10 that includes both base assembly 60 and a sealed casing 20 housing analytical elements, or can purchase base assembly 60 and casing 20 separately. Additional sealed casings can be purchased as re-fills. When the analytical elements in the casing 20 in use are depleted, the empty casing 20 is discarded. A new sealed casing 20 housing analytical elements is then secured to the re-usable base assembly The drum type container can be removably mounted to a biosensor device, such a blood glucose meter, so that the analytical elements are selectively dispensed from the container for ready access and use. Meter is shown with a display and a user interface on a front side thereof. Meter extends between opposite ends , In either embodiment of FIG. One of the ends , , such as end in the illustrated embodiment, includes a port with circuitry to measure one or more properties of a bodily fluid deposited on an analytical element dispensed from container 10 when inserted in port The other of the ends, such as end in the illustrated embodiment, is sized for positioning through end opening of cradle Cradle includes a U-shaped body having opening at one end thereof and a receptacle at the end thereof opposite end opening Receptacle is sized to receiver container 10 therein along path , as shown in FIG. When assembled, meter resides between the walls of U-shaped body with display visible through opening of cradle Body engages base assembly 60 to prevent it from rotating relative to cradle , while body defines a window that opens into receptacle to provide access to casing The user can access and rotate casing 20 in receptacle through window relative to base assembly 60 to align the selected compartment portion 36 with dispensing mechanism 80 to dispense an analytical element 24 through the end of casing When casing 20 is depleted of analytical elements, container 10 can be removed from cradle and the depleted casing 20 removed from base assembly 60 for disposal of casing A new casing 20 can then be mounted to base assembly 60, and the assembled container 10 re-positioned in receptacle of cradle for subsequent use.

Chapter 2 : Psychoanalytic theory - Wikipedia

*Analytical Elements of Mechanisms [Dan B. Marghitu, Malcolm J. Crocker] on www.nxgvision.com *FREE* shipping on qualifying offers. A knowledge of the kinematic and dynamic properties of mechanisms is essential for their design and control.*

Kinematics - Analysis of Mechanisms: Methods and Techniques written by: The performance of a machine is analyzed by calculating the position, velocity and acceleration of points on the different parts of the mechanisms and tracing the trajectory they follow. This study of motion involves linear as well as angular position, velocity and acceleration of different points on members of mechanisms. Analysis and synthesis are two different aspects of mechanisms and machine design. Earlier design engineers used drafting equipments to graphically analyse the mechanisms. The continuous contribution by design engineers for years has lead to development of many methods and techniques for analysis of mechanisms. Recently, the development of computer techniques have offered a number of viable and attractive solutions. Each method has many techniques for analysis of mechanisms, where each technique is suitable for a particular category of mechanisms. With the development of sophisticated computer programs design engineers prefer to concentrate their effort on analytical approach. But still the graphical approach to mechanism analysis has not lost its utility, specially in some cases where graphical technique gives the most efficient solution and physical insight to visualize working of the mechanism. Graphical Method of Mechanism Analysis Graphical method starts with position analysis by simply drawing the linkage mechanism to scale. Then the velocity analysis is performed which requires the angular position of the links to be determined beforehand. Similarly it is necessary to know angular velocities of links for acceleration analysis. Thus, the sequence for kinematic analysis of mechanisms is - position analysis, then velocity analysis and then acceleration analysis. Velocity and acceleration are vectors and thus their sum or difference will follow vector polygon laws. If velocity of one point on a link is known then the velocity of other points can be found using the vector polygons. This technique is based on vector polygon laws. Velocity and Acceleration Image: This technique is used for graphical analysis of mechanisms with more than one loop. If the velocity and acceleration of two points on a link are known then the velocity and acceleration of third point on that link can be determined using velocity and acceleration image. When it is not possible to analyse the linkage directly using vector polygon approach then Inversion Technique is used. In this technique the driven and driver cranks are interchanged to perform graphical analysis. Relative Velocity and Acceleration: This technique is used to analyse mechanisms with large number of members. Instant Center of Velocity: For a rigid body moving in a plane, at every instant there exists a point that is instantaneously at rest. This instant center of velocity for the given rigid body is found using standard methods. It is useful for finding input-output velocity relationships of complex mechanisms. Analytical Method of Mechanism Analysis Analytical method is used when repetitive and extensive analysis of mechanisms is required, as the analytical equations and solutions obtained can be conveniently programmed on a computer. In this approach vector position, velocity and acceleration equations are formulated based on the fact that there are two different paths connecting the points on a vector loop. The equations thus obtained are simplified and programmed using computers. Desirable solutions are obtained by varying the parameters. These mechanisms are governed by Kinematics â€" the study of geometry and motion.

Chapter 3 : Kinematics - Analysis of Mechanisms: Methods and Techniques for mechanism analysis

A knowledge of the kinematic and dynamic properties of mechanisms is essential for their design and control. This volume describes methods and algorithms for the analysis of kinematic systems.

But with the emergence of psychoanalysis as a distinct clinical practice, both terms came to describe that. Although both are still used, today, the normal adjective is psychoanalytic. Psychoanalytic theorists believe that human behavior is deterministic. It is governed by irrational forces, and the unconscious, as well as instinctual and biological drives. Due to this deterministic nature, psychoanalytic theorists do not believe in free will. Josef Breuer , especially when it came to the study on Anna O. Today, Breuer can be considered the grandfather of psychoanalysis. The research and ideas behind the study on Anna O. These observations led Freud to theorize that the problems faced by hysterical patients could be associated with painful childhood experiences that could not be recalled. The influence of these lost memories shaped the feelings, thoughts and behaviours of patients. These studies contributed to the development of the psychoanalytic theory. The id is the aspect of personality that is driven by internal and basic drives and needs. These are typically instinctual, such as hunger, thirst, and the drive for sex, or libido. The id acts in accordance with the pleasure principle , in that it avoids pain and seeks pleasure. Due to the instinctual quality of the id, it is impulsive and often unaware of implications of actions. The ego is driven by the reality principle. It helps separate what is real, and realistic of our drives as well as being realistic about the standards that the superego sets for the individual. The superego is driven by the morality principle. It acts in connection with the morality of higher thought and action. Instead of instinctively acting like the id, the superego works to act in socially acceptable ways. It employs morality, judging our sense of wrong and right and using guilt to encourage socially acceptable behavior. Freud said that it is the unconscious that exposes the true feelings, emotions, and thoughts of the individual. There are variety of psychoanalytic techniques used to access and understand the unconscious, ranging from methods like hypnosis, free association, and dream analysis. Whereas latent content is the underlying meaning of a dream that may not be remembered when a person wakes up, manifest content is the content from the dream that a person remembers upon waking and can be analyzed by a psychoanalytic psychologist. Exploring and understanding the manifest content of dreams can inform the individual of complexes or disorders that may be under the surface of their personality. Dreams can provide access to the unconscious that is not easily accessible. They are considered mistakes revealing the unconscious. Examples range from calling someone by the wrong name, misinterpreting a spoken or written word, or simply saying the wrong thing. It thus reacts to protect the individual from any stressors and anxiety by distorting reality. This prevents threatening unconscious thoughts and material from entering the consciousness. The different types of defense mechanisms are: Repression , reaction formation , denial , projection , displacement , sublimation , regression , and rationalization. It is a stage theory that believes progress occurs through stages as the libido is directed to different body parts. The different stages, listed in order of progression, are: The Genital stage is achieved if people meet all their needs throughout the other stages with enough available sexual energy. They do not support the idea that development of the personality stops at age 6, instead they believed development spreads across the lifespan. Critics of psychoanalytic theory[edit] The psychoanalytic approach has a variety of advantages and limitations that have spurred further research and expansion into the realm of personality development. Advantages[edit] The theory emphasizes the importance of childhood experiences. Limits[edit] Some claim that the theory is lacking in empirical data and too focused on pathology. Freud is considered a philosopher in some areas, and other philosophers, such as Jacques Lacan , Michel Foucault , and Jacques Derrida have written extensively on how psychoanalysis informs philosophical analysis. An Elementary Textbook of Psychoanalysis - Revised edition.

Chapter 4 : Malcolm J. Crocker (Author of Analytical Elements of Mechanisms)

Analytical Elements of Mechanisms Mechanisms are fundamental components of machines. They are used to trans-mit forces and moments and to manipulate objects in industrial machinery.

It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates. Existing test strips for glucose monitoring are available in a variety of packaging. Various embodiments of the present invention relate to an easy to use primary drum type container for blood glucose strips. In one embodiment, the drum type container may be used as a stand-alone container and dispensing system for test strips such that it is not mounted or otherwise associated with the blood glucose meter. Examples of drum type containers are provided in U. In other embodiments, the drum type container is mounted with a blood glucose meter, as discussed further below. With reference to FIGS. Container 10 may be described herein as containing and dispensing glucose test strips. However, the container might contain and dispense other analytical elements. Container 10 includes a casing 20 that defines an internal compartment The internal compartment 22 includes a plurality of compartment portions 36 each sized and configured to receive at least one analytical element 24, such as blood glucose test strips. Casing 20 is mounted to a base assembly A sliding dispenser mechanism 80 translates as indicated by arrow 81 to cause the container 10 to eject an analytical element 24 from a selected one of the portions 36 of compartment 22, such as shown in FIG. Casing 20 is rotatable on base assembly 60 about a longitudinal axis 28 of container 10, as indicated by arrow 12 of FIG. Housing 26 defines a central bore 34 centered along longitudinal axis 28 that extends between first end 30 and second end Bore 34 opens at least at second end As shown in FIG. Housing 26 defines internal compartment 22 for housing a number of analytical elements Compartment 22 may include a plurality of separate compartment portions 36 extending along the length of housing Each of compartment portions 36 opens at each of first and second ends 30, 32 of housing A separate analytical element 24 can be positioned in each of the compartment portions Only a few of compartment portions 36 are shown with an analytical element 24 in FIG. In one embodiment, each of the compartment portions 36 is connected to a respective desiccant chamber Each desiccant chamber 38 is in communication with it respective compartment portion 36 via an airway that extends between and opens in desiccant chamber 38 and compartment portion Each desiccant chamber 38 houses a desiccant to control moisture in the respective connected compartment portion 36 to preserve the integrity of the analytical element 24 housed in the compartment portion Other configurations for compartment portions 36 and desiccant chambers are within the ordinary skill in the art and are not elaborated upon here. Casing 20 also includes a first sealing member 40 connected at first end 30 of housing 26 and a second sealing member 42 connected at second end 32 of housing Sealing members 40, 42 provide a seal that prevents moisture and other containments from entering the compartment portions 36, and provide a hermetic seal to isolate the analytical elements 24 from the environment. In one embodiment, sealing members 40, 42 are made from sealable foil that is about 0. The sealable foil is applied to each end 30, 32 of housing 26 with analytical elements 24 in compartment portions Sealing members 40, 42 are sealed with the end wall portions of housing 26 located between and around compartment portions 36 so that each of the compartment portions is sealed individually and separately from the other compartment portions Thus, if one of sealing members 40, 42 is punctured at one of the compartment portions 36, the remaining compartment portions remain sealed from the environment by sealing members 40, Other embodiments contemplate other forms and materials for sealing members 40, For example, each of the compartment portions 36 can be provided with a separate lid, valve, or cap over its respective end openings. As discussed further below, housing 26 includes a number of detents 44 only a few of which are designated with reference numeral 44 in FIG. Detents 44 are spaced uniformly and radially about longitudinal axis 28 and in the illustrated embodiment are located adjacent to the circumferential edge of housing Each of the detents 44 is positioned between adjacent ones of respective compartment portions Detents 44 extend into and are recessed in the end surface of body 26 at second end 32 in the direction of longitudinal axis Base assembly 60 includes a cylindrical body 64 with a side wall 65 and end wall 67 that define a cavity As used herein, the term upper refers to the end or direction of base assembly 60 oriented toward casing 20, and not necessarily to the orientation of container 10 when held or used by the user. Side wall 65 extends from end wall 67 to an upper end 74 where cavity 66 opens. In one embodiment, a spindle 68 is centered in body 64 and extends in cavity 66 from end wall 67 to an outer end 72 that projects from upper end 74 of body Spindle 68 is sized for positioning in bore 34 of housing 26, and extends along longitudinal axis 28 of container 10 when housing 26 is positioned on spindle Housing 26 is rotatable about spindle 68 to align a selected one of compartment portions 36 with dispenser mechanism Spindle 68 includes a resilient or molded flange 70 extending therefrom adjacent to outer end Flange 70 flexes to permit placement of housing 26 about spindle 68 with lower end 32 of housing 26 and sealing member 42 adjacent to and supported by upper end 74 of body 64, as shown in FIGS. Flange 70 frictionally maintains the axial position of casing 20 relative to base assembly 60, yet permits removal when sufficient force is applied along longitudinal axis 28 to separate base assembly 60 and casing 20 by overcoming the resistance supplied by flange Referring now to FIGS. Side wall 65 of body 64 includes a slotted opening 78 also see FIGS. Dispenser mechanism 80 is mounted in and extends through slotted opening Dispenser mechanism 80 includes a plunger 82 in cavity 66 and an actuator 84 along body 64 outside cavity Actuator 84 and plunger 82 are linked to one another by a connector 86 extending through opening In other embodiments, actuator 84 is spring-biased to normally maintain plunger 82 in the retracted position shown in FIGS. Actuator 84 is readily accessibly by the user to move plunger 82 relative to body 64 toward and away from second end 32 of casing When it is desired to dispense an analytical element 24 from its respective compartment portion 36, the user slides or moves actuator 84 along slotted opening 78 toward casing 20, which in turn advances an upper end 88 of plunger 82 through sealing member 42 and into the aligned compartment portion 36 housing the desired analytical element Upper end 88 of plunger 82 engages the lower end of the analytical element 24 and pushes the upper end of the analytical element 24 through sealing member 40 at first end 30 of housing The analytical element 24 is produced out of its respective compartment portion 36 so it can be pulled from casing 20 by the user, as shown in FIG. Plunger 82 and the produced analytical element 24 only puncture the portions of sealing members 40, 42 sealing the compartment portion 36 in which the produced analytical element 24 was stored, while the remaining compartment portions 36 remain sealed by sealing members 40, 42 unless an analytical element was already produced therefrom. Locking mechanism 90 includes at least one locking member 92 housed in a receptacle 94 of body 64 located in a support member 69 in cavity Locking member 92 includes a base portion 96 and an upper portion Base portion 96 is captured in receptacle 94, and a biasing member in receptacle 94 normally biases locking member 92 outwardly so that upper extension 98 projects outwardly from upper end 74 of body In the locking position shown in FIG. The engagement between locking member 92 and detent 44 securely maintains the rotational positioning of casing 20 on base assembly 60 with plunger 82 aligned with one of the compartment portions 36 for subsequent ejection of an analytical element 24 via movement of actuator After removal of the analytical element 24, casing 20 can be rotated as indicated by arrow 12 in FIG. This rotational force and the rounded interface between detent 44 and locking member 92 pushes locking member 92 against spring and into receptacle 94, as shown in FIG. This allows rotation of casing 20 until the next adjacent detent 44 is aligned with locking member Spring then forces locking member 92 into the next aligned detent 44 and secures casing 20 in a rotationally selected position relative to base assembly 60 with plunger 82 aligned with the next adjacent compartment portion In one embodiment, it is contemplated that sealing member 42 is configured and sized relative to housing 26 so that detents 44 are not covered or obstructed by sealing member 42, such as shown in FIG. This allows direct contact between the material comprising housing 26 and locking member In another embodiment, it is contemplated that sealing member 42 is punctured or deformed by locking member 92 by the biasing force of spring so that locking member 92 is sufficiently received in detent 44 to maintain the selected rotational position. The dual locking members 92 associated with this embodiment of locking mechanism 90 simultaneously engage the respective detents 44 located on each side of the selected compartment portion 36 aligned with plunger The dual locking members 92 can increase resistance to rotation of casing 20 relative to base assembly 60 until sufficient rotational force is applied to overcome the resistance supplied by each locking member 92 and its respective biasing member Other embodiments contemplate more than two locking members are provided to engage more than two detents In yet other embodiment, locking mechanism 90 includes a single locking member By providing the interface of locking mechanism 90 with casing 20 on the end of casing 20, the overall profile of container 10 is minimized. Other than actuator 84, the moving parts of dispenser mechanism 80 and locking mechanism 90 are confined within container 10, minimizing the potential for damage or tampering. Other embodiments of container 10 contemplate arrangements where the locking mechanism 90 is not confined within container It is contemplated that locking members 92 include a spherical upper end to facilitate rotation of casing 20 when sufficient force is applied thereto to displace locking member 92 against the bias of spring when it is received in a detent In the illustrated embodiment, locking member 92 includes a cylindrical body extending between its upper portion 98 and base portion Other embodiments contemplate that base portion 96 and upper portion 98 form a sphere. Base portion 96 can be retained within receptacle 94 with a C-shaped retaining member, a lip, or other structure at the upper end of receptacle 94 to prevent passage of base portion 96 therethrough. In one embodiment, casing 20 is a disposable portion of container 10 and base assembly 60 is a reusable portion of container The user can initially purchase a container 10 that includes both base assembly 60 and a sealed casing 20 housing analytical elements, or can purchase base assembly 60 and casing 20 separately. Additional sealed casings can be purchased as re-fills. When the analytical elements in the casing 20 in use are depleted, the empty casing 20 is discarded. A new sealed casing 20 housing analytical elements is then secured to the re-usable base assembly The drum type container can be removably mounted to a biosensor device, such a blood glucose meter, so that the analytical elements are selectively dispensed from the container for ready access and use. Meter is shown with a display and a user interface on a front side thereof. Meter extends between opposite ends , In either embodiment of FIG. One of the ends , , such as end in the illustrated embodiment, includes a port with circuitry to measure one or more properties of a bodily fluid deposited on an analytical element dispensed from container 10 when inserted in port The other of the ends, such as end in the illustrated embodiment, is sized for positioning through end opening of cradle Cradle includes a U-shaped body having opening at one end thereof and a receptacle at the end thereof opposite end opening Receptacle is sized to receiver container 10 therein along path , as shown in FIG. When assembled, meter resides between the walls of U-shaped body with display visible through opening of cradle Body engages base assembly 60 to prevent it from rotating relative to cradle , while body defines a window that opens into receptacle to provide access to casing The user can access and rotate casing 20 in receptacle through window relative to base assembly 60 to align the selected compartment portion 36 with dispensing mechanism 80 to dispense an analytical element 24 through the end of casing When casing 20 is depleted of analytical elements, container 10 can be removed from cradle and the depleted casing 20 removed from base assembly 60 for disposal of casing A new casing 20 can then be mounted to base assembly 60, and the assembled container 10 re-positioned in receptacle of cradle for subsequent use.

Chapter 5 : USB2 - Drum type container for analytical elements - Google Patents

The book, Analytical Elements of Mechanisms, is the latest in the classic area of mechanical engineering where a number of other texts dealing with kinematic analysis of mechanisms are available. It describes methods and algorithms for the kinematic analysis of mechanisms.

Portrait from the Illustrated London News, Nov. This was done by the great Charles Babbage , and the name of the machine is Analytical Engine. In Babbage designed some improvements to his first computerâ€"the specialized Difference Engine. In the original design, whenever a new constant was needed in a set of calculations, it had to be entered by hand. Babbage conceived a way to have the differences inserted mechanically, arranging the axes of the Difference Engine circularly, so that the result column should be near that of the last difference, and thus easily within reach of it. He referred this arrangement as the engine eating its own tail or as a locomotive that lays down its own railway. But this soon led to the idea of controlling the machine by entirely independent means, and making it perform not only addition, but all the processes of arithmetic at will in any order and as many times as might be required. Work on the first Difference Engine was stopped on 10 April, , and the first drawing of the Analytical Engine is dated in September, There exist over two hundred drawings, in full detail, to scale, of the engine and its parts. These were beautifully executed by a highly skilled draftsman and were very costly. The object of the machine may shortly be given thus according to Henry Babbage, the youngest son of the inventor: It is a machine to calculate the numerical value or values of any formula or function of which the mathematician can indicate the method of solution. It is to perform the ordinary rules of arithmetic in any order as previously settled by the mathematician, and any number of times and on any quantities. It is to be absolutely automatic, the slave of the mathematician, carrying out his orders and relieving him from the drudgery of computing. It must print the results, or any intermediate result arrived at. Babbage intended to design a machine with a repertoire of the four basic arithmetic functions, in contrast with the Difference Engine, which is using only addition. On the analogy of a modern digital computer, the design principle of the Analytical Engine can be divided to: From on, punched cards see the nearby photo were the basic mechanism for feeding into the machine both numerical data and the instructions on how to manipulate them. For Babbage this was basically the number axes in the store, though he also developed the idea of a hierarchical memory system using punched cards for additional intermediate results that could not fit in the store. Babbage called this the Mill. Like modern processors it provided for storing the numbers being operated upon most immediately registers ; hardware mechanisms for subjecting those numbers to the basic arithmetic operations; control mechanisms for translating the user-oriented instructions supplied from outside into detailed control of internal hardware; and synchronization mechanisms a clock to carry out detailed steps in a carefully timed sequence. The control mechanism of the Analytical Engine must execute operations automatically and it consists of two parts: The sequence of smaller operations required to effect an arithmetical operation was controlled by massive drums called barrels see the nearby figure. The barrels had studs fixed to their outer surface in much the same way as the pins of a music box drum or a barrel organ. The barrels orchestrated the internal motions of the engine and specify in detail how multiplication, division, addition, subtraction, and other arithmetic operations, are to be carried out. The barrel shown in the illustration has only several stud positions in each vertical row. In the actual machine, the barrels were much larger because they controlled and coordinated the interaction of thousands of parts. Each row could contain as many as stud positions, and each barrel could have 50 to separate rows. The overall machine had several different barrels controlling different sections. Naturally, the barrels had to be closely coordinated with one another. As a barrel turned, the studs activated specific motions of the mechanism and the position and arrangement of the studs determined the action and relative timing of each motion. The act of turning the drum thus automatically executed a sequence of motions to carry out the desired higher level operation. The process is internal to the Engine and logically invisible to the user. The technique is what in computing is now called a microprogram though Babbage never used this term , which ensures that the lower level operations required to perform a function are executed automatically. For higher level control mechanism, Babbage initially intended to use a big central barrel, to specify the steps of a calculation. This idea however seems impractical, because this will require changing the studs on the super barrel, which could be a cumbersome operation. The task of manually resetting studs in the central drum to tell the machine what to do was too cumbersome and error-prone to be reliable. Worse, the length of any set of instructions would be limited by the size of the drum. His struggle with the problem of control led Babbage to a real breakthrough on June 30, He conceived of providing instructions and data to the engine not by turning number wheels and setting studs, but by means of punched card input, by means of cards, similar to these, used in the Jacquard looms. This did not render the central drum obsolete nor replace it. Punched cards provided a new top level of the control hierarchy that governed the positioning of the central drum. The central drum remained, but now with permanent sequences of instructions. It took on the function of micro-programming, as this of other barrels. If there were separate barrels for each operation, and a central barrel for controlling the operations drums, the punched card presents a way of instructing the machine the central drum as to which operations we wished to perform and in what order, i. The principle of cards was openly borrowed from the Jacquard loom a mechanical loom, invented by the Frenchman Joseph Marie Jacquard in the beginning of s, based on earlier inventions of his compatriots Basile Bouchon , Jean Falcon and Jacques Vaucanson , which used a string of punched cards to automatically control the pattern of a weave see the nearby photo. In the loom, rods were linked to wire hooks, each of which could lift one of the longitudinal threads strung between the frame. The rods were gathered in a rectangular bundle, and the cards were pressed one at a time against the rod ends. If a hole coincided with a rod, then the rod passed through the card and no action was taken. If no hole was present then the card pressed back the rod to activate a hook which lifted the associated thread, allowing the shuttle which carried the cross-thread to pass underneath. The cards were strung together with wire, ribbon or tape hinges, and fan, folded into large stacks to form long sequences. The looms were often massive and the loom operator sat inside the frame, sequencing through the cards one at a time by means of a foot pedal or hand lever. The arrangement of holes on the cards determined the pattern of the weave. How can be programmed the Analytical Engine? There is nothing in the surviving papers in which this aspect of the machine is thoroughly discussed, e. This is the more remarkable for it is the only aspect of the design that is discussed at length in a contemporary paper. These deal with the familiar modern ideas of flow of control in programs, particularly the formulation of simple loops and nested loops controlled by counters. However, the paper and notes carefully and deliberately skirt around any discussion of details of the means by which these are to be implemented. It seems that Babbage did not have a command of the issues raised by the user-level programming of the Analytical Engine. It would be quite wrong to infer that Babbage did not understand programming per se. The microprogramming of the barrels for multiplication and division show command of the basic branching and looping ideas and his skills in the microprogramming of addition and subtraction show complete virtuosity. It was from this base that Babbage explored the ideas of user-level programming. The issues of data structuring simply did not arise at the microprogramming level. From the hardware point of view, two strings of punched cards were needed to specify a calculation to be performed by the Analytical Engine. One string, the "operation cards," specified the arithmetic operations to be performed. The second string, the "variable cards," specified the axes in the store that contained the operands and were to receive the results. These two strings cannot be regarded as separate parts of a single instruction, as are the operation and operand fields of an instruction in an electronic digital computer, because the operation and variable cards were intended to move and loop independently of one another under the direction of separate control mechanisms. Actually there were four, but no two, different kinds of punched cards with different functions: Number cards were used to specify the value of numbers to be entered into the store, or to receive numbers back from the store for external storage. Variable cards specified which axes in the store should be the source of data fed into the mill or the recipient of data returned from it. In modern parlance, they supplied the memory address of the variables to be used. Operation cards determined the mathematical functions to be performed. The logical content of an operation card might have been like this example: Combinatorial cards controlled how variable cards and operation cards turned backward or forward after specific operations were complete. Thus, an operation card might have a logical content like this: Babbage seems to have been led to separate the operation and variable cards on largely philosophical grounds stemming from his belief in the need to distinguish symbols for operation from those for quantity in mathematical notations. These views were probably reinforced when he considered the cards necessary for calculations such as the solution of simultaneous equations. Babbage realized also, that programs or subroutines certainly not terms that he used would need to be verified, what we would call debugged. He also knew that it would be valuable to rerun verified programs on new sets of data, and even to share programs across multiple engines. Thus, it was a natural and practical approach to specify the data as being independent of the operations. There the pattern of operations required for carrying out row reductions is very simple and a straightforward loop of operation cards is readily found. No such simple loop structure exists for the variable cards, which can only specify single axes in the store. The loop structures that we now recognize concern rows of the matrix of coefficients of the equations and similar concepts related to the structuring of the data. As Babbage did not have the concept of a variable address in the store, neither was the Analytical Engine able to calculate the location of an operand in the store, there was no way in which the user programs could exploit this higher level structure in the data. From the current point of view, the series of operation cards provided not a program, in current terms, but a series of subroutines. The combinatorial cards provided terminology, a control-flow program, invoking subroutines with call-by-reference values provided by the variable cards. Since he had no experience in programming an actual computer however, it is not surprising that Babbage did not get to the modern concepts of higher level languages, interpreters, or compilers. The full detail of the cards of all sorts required, and the order in which they would come into play is this: The four Number Cards for the "given numbers" a, b, c and d, strung together are placed by hand on the roller, these numbers have to be placed on the columns assigned to them in a part of the machine called "The Store," where every quantity is first received and kept ready for use as wanted. Each set of cards would be strung together and placed on a roller or prism of its own; this roller would be suspended and be moved to and from. Each backward motion would cause the prism to move one face, bringing the next card into play, just as on the loom. It is obvious that the rollers must be made to work in harmony, and for this purpose the levers which make the rollers turn would themselves be controlled by suitable means, or by general Directive Cards, and the beats of the suspended rollers be stopped in the proper intervals. A general plan of the Analytical Engine from click to see a larger image In the upper general view of Analytical Engine can be seen the basic sections: In practice, the store would have been much longer, with many more variable axes; Babbage sometimes considered a minimum of , and as many as Each variable axis contained many figure wheels rotating around a central axle, each holding one digit of its variable. Babbage usually planned to have 40 digits per variable. One extra wheel on top recorded whether the value was positive or negative. Running horizontally between the variable axes were the racks, long strips of metal with gear-toothed edges that carried digits back and forth between the store and the mill. Small movable pinions were positioned either to connect a given variable axis to the racks or to leave it unconnected.

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