Purpose: The main purpose of this article is to explore the plan to foster the experts in reserve forces of the Korean armed forces based on a review of the operation of reserve forces in foreign countries, such as the United States and Germany, in consideration of the rapidly changing international situation and security changes on the Korean Peninsula following the Russian invasion of Ukraine. It is intended to examine the relevant development, and at the same time, while there are differences in terms of policy and implementation aspects, it is intended to make suggestions regarding policy development by deriving implications through the comparative analysis of the reserve forces system of Korea and the United States.

Method: Considering the characteristics of this study, it was primarily composed of literature studies such as official documents, research papers, and related degree dissertations of the Korean and U.S. governments, Internet materials. As examples of the development of reserve forces in foreign countries, including the United States, case analysis of the reserve forces service system and organization method, reserve forces training, etc., were used. Based on which, various implications were drawn for fostering the reserve forces experts for Korea’s elite reserve force.

Result: For emphasis purposes, the U.S. and Germany legally maintain the same status as active duty and reserve forces. This is because budgeting and policy establishment for reserve forces are applied in the same manner as in active duty. In particular, the U.S. develops and applies the AGR and ADOS systems based on the legal basis and budget, and operates the reserve force as a unit from the peacetime. However, Korea is currently conducting a short mobilization call training for three days and two nights. In case of emergency, after the general mobilization order is issued, the unit enters into the relevant unit to increase the mobilization and establish the unit. Moving forward, it is necessary to train the reserve forces experts who can contribute to shortening the gap between peacetime and when the general mobilization order is issued.

Conclusion: The lessons learned from the Russo-Ukraine war are the spirit of armed struggle from the leader to the people, the strategy and tactics to operate the weapon system, and above all, the very importance of mobilizing the reserve force that can demonstrate practical combat power in the battlefield in case of emergency. As such, it is very important to prepare a plan for fostering the reserve forces experts in consideration of changes in the international order in the 21st century, declining population, changes in war patterns such as hybrid warfare shown in the Russo-Ukraine war, and Korea’s future defense environment, among the key tasks of the Defense Reform 4.0.

Keywords: Russo-Ukraine War, Changes in the Defense Environment, Elite Reserve Forces, Non-Standing Reserve Forces System, Defense Reform 4.0
1. Introduction

The Russian-Ukraine War which broke out on February 24, 2022 is prolonged. The Russian and Ukrainian military power ranks 2nd and 22nd, each respectively. In terms of military power, it is equivalent to the level of “David and Goliath”. The analysis of the Russian-Ukraine War is overwhelmingly a synopsis of the wars that have taken place over the past 100 years. It renders new aspects and characteristics, such as the expansion of the subject of war, the expansion of the battlefield area, and the diversification of the means of war[1][2]. Above all, it is apparent that the reserve force is not able to exert its immediate combat power unless the mobilization system is in place or is not ready. At the same time as the outbreak of the Ukrainian War, a total mobilization order was issued, and only about 36,000 people were initially mobilized[3].

Similarly in Russia, at the beginning of the war, the active duty consisting of 100-120 battalion tactics was first deployed, and as the war prolonged, active duty replenishment soldiers prohibited by law or foreign mercenaries were introduced rather than mobilizing reserve forces. The role of reserve forces among major countries, including the Korean armed forces, has been drawing attention in the wake of the Russo-Ukraine War. In particular, major advanced military countries, such as the United States and Germany, are also making continuous efforts to enhance their reserve forces. Most of such countries are already taking measures to prepare for battle promptly by fostering active duty and full-time reserve forces experts before the wartime mobilization order is declared and the mobilization reserve forces are deployed. Considering the future changes in the defense environment, the development of advanced science and technology, the declining population, and the aging population, it is necessary to re-establish the concept of elite reserve forces and to consider ways to train experts for elite training in order to demonstrate the responsive force at the same time as the declaration of the total mobilization order.

According to the Republic of Korea Army's operating manual on "Mobilization and reserve forces work", "reserve forces refer to the units or individuals that are mobilized in case of emergency and are organized to carry out the national defense related duties such as expansion of active military units or regional defense, while the primary mission is to ensure economic military operation by preparing for troop mobilization, regional defense, and disaster management support, and to contribute to comprehensive security by ensuring the performance of a part of the war deterrent and national total defense"[4].

The advancement of the Korean armed forces into an elite reserve force is one of the important defense policy tasks that have been pursued for a long time. In Defense Reform 2.0, the reserve force was more actively promoted than ever before. Furthermore, the long-term planning document, “Defense Vision 2050,” includes the contents of the defense policy for the elite reserve force[5]. The “Defense Reform 4.0” of the Yun Seok-Yeol administration also included a defense policy for upgrading the reserve force into an elite in consideration of the future defense environment. Considering the war patterns of the Russian-Ukraine War, the declining population and aging, the 4th industrial revolution and the development of advanced science and technology, and the harmony between national security and people's livelihood, the formation of elite reserve forces and fostering reserve forces are not quantitative but qualitative issues. Given such context, the structure of the paper as follows is as follows. Chapter II examines the environmental change of reserve forces operation, Chapter III examines the case of U.S. reserve forces power generation, and Chapter IV proposes a development plan for fostering the Korean reserve forces experts.

2. Plan for the Advancement of the Korean Armed Forces’ Reserve Forces and the Changes in the International Security Environment
2.1. Rapidly changing international security environment and the changes in war patterns

In the 21st century international order, alongside the competition for hegemony between the United States and China, the importance of human security is further strengthened due to the innovative evolution of advanced science and technology of the 4th industrial revolution and the COVID-19 pandemic[6]. In the recent Russo-Ukraine war, an order focused on the U.S., which values a liberal-based alliance, and an order centered on China and Russia, which are regional powers, have clearly surfaced. Due to the Russo-Ukraine war, a change in the war paradigm and a radical change in the power system such as the weapon system are required, and it is also expected to affect the innovation of reserve forces by country[7].

It would be necessary to pay attention to how the concept of military operation and combat performance operating on the battlefield will change, if the development of advanced military science and technology led by the 4th industrial revolution is actually turned into an army. This is a central paralysis based rapid decision operation that has been proven effective in the information age, a new type of non-linear distributed operation centered on small units with strong combat power, multi-domain combat to maximize the synergy effect of the entire battlefield, and the cooperation between human and robot combatants, while the development of the unmanned integrated combat concept is expected to further accelerate. The reserve force also requires more reserve forces and the fostering of reserve forces experts in line with the mission and role of the reserve force rather than sticking to the custom of reusing equipment and material[8].

If the military force of the past focused on traditional security, it now ought to play a complementary role in various security areas in preparation for comprehensive security threats. As we saw in the COVID-19 pandemic, they have maintained a military readiness posture based on the assumed threat of the enemy, but in order to respond to the COVID-19 situation at home and abroad, they have no choice but to support the military power they have. Systematic support such as military medical facilities, professional manpower support, overseas travel, and vaccine transportation was well received by the public. In the places that threaten the lives of the people, such as climate change, epidemics, cybersecurity, and disasters, it has become essential to convert the military power to the concept of national total warfare[9].

2.2. Lessons learned from the Russian-Ukraine war and the decrease in the military service resources due to low fertility and aging

Focusing on the lessons of the Russian-Ukraine War, the formation and development of reserve forces of the Korean armed forces inevitably face a structural reorganization as the military service resources are reduced due to the declining population. By 2022, the number of standing forces will be reduced to 500,000. Instead, they are pursuing a reform of the national defense manpower structure, such as the expansion of cadres, female soldiers, and civilian personnel, and the advancement of reserve forces is being pursued. The 2020 population dead cross has already begun[10]. Korea is the only country in the world with a total fertility rate of less than one person. The total fertility rate in 2020 was 0.837, but in 2021, it dropped to 0.81, and in 2022, it is expected to be 0.7, respectively. The ultra-low fertility is expected to lead to a sharp decrease in military service resources within the next few years, and it seems that it will operate as a major constraint on the recruitment of forces and the operation of reserve forces[11].

Furthermore, the 20-year-old male population will drop sharply from 330,000 in 2020 to 230,000 in 2025 and 155,000 in 2040, and from 2034, 12 years later, the number of people eligible for active duty service per year will be less than the number required by the military, respectively. It is projected that by 2040, after the second declining population, there will be an annual shortage of about 60,000 people. If the available resources on active duty decrease, the
reserve forces will also decrease in series due to the structure in which personnel who have completed active duty are re-entered into reserve forces. The total available resources of the reserve forces in 2040 is estimated to be about 944,000 (581,000 reserve forces in the 1st to 3rd years, and 363,000 reserve forces in the 4th and 5th years)[12].

Given such decrease in the fertility rate, it is predicted that by 2040, there will be a shortage of about 90,000 active duty soldiers based on 500,000 people in the standing army and 105,000 people short of reserve forces. Considering that the long-term defense planning is usually effective in 10 to 20 years, alternatives should be prepared in preparation for future reserve force operation from now until 2040. Meanwhile, as Korea enters the age of aging, the working-age population will plunge below 50% by 2050, making it the country with the highest proportion of the aged population in the world. This will lead to deterioration of the national finances due to a decrease in the potential growth rate and a sharp increase in social security costs, which will act as a constraint on the increase in defense spending, and the decline of the reserve forces resources can also be further accelerated[13].

3. Service System and Characteristics of the Non-Standing Reserve Forces of the Korean Armed Forces

The non-standing reserve forces that the military is currently promoting are divided into the two types. The short-term non-standing reserve forces service system is one in which one serves within 30 days a year for positions that can achieve results through relatively short-term operation, while the goal is to recruit 4,093 people by 2024. Furthermore, the long-term non-standing reserve forces service system is one in which one serves within 30 to 180 days per year for positions that require expertise and long-term management. Considering the study result that the standing reserve forces require 10% of the standing reserve forces, it is necessary to increase the number of non-standing reserve forces that are less than 1% of the current standing reserve force by over 10 times refer to <Table 1>.

To achieve this military goal, it is necessary to come up with an alternative, taking into account the difficulties of promoting the U.S. military recruitment system mentioned above. Status, remuneration, occupational characteristics, and welfare benefits for non-standing reserve forces are relatively insufficient. To foster the reserve forces experts for the elite reserve force, it is necessary to analyze foreign cases and prepare in advance in line with the Korean situation. Unlike the U.S. and German reserve forces, the non-standing service reserve forces do not have a military status under the current law, and hence, they are relatively lacking in terms of benefits such as the salary system, military pension, promotion system, and insurance system like active duty soldiers[14]. Furthermore, as there is no legal basis that even veterans can serve as reserve forces, continuous service for a long period of time is limited, resulting in a relatively lack of professionalism. To address such problems, there is a continuous demand for system improvement in the land base to ensure that veterans can serve, including reserve soldiers, in the reserve forces. The recruitment system was established by the U.S. military after about 50 years of trial and error, and in Korea, it is a long-term task that requires many tasks, such as forming a consensus among the people, improving laws and systems, securing the budget, and reorganizing the military structure, subject to continuing research and development[15].
Table 1. Short-term and long-term non-standing reserve forces system.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Short-term non-standing reserve forces</th>
<th>Long-term non-standing reserve forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>Reservist - lieutenant colonel • scheduled for recruiting soldiers from 2023</td>
<td>Reservist - lieutenant colonel</td>
</tr>
<tr>
<td>Management position</td>
<td>Positions that can achieve results over a relatively short period of time • company and platoon captains, head of squad, etc.</td>
<td>Positions that require expertise and long-term operation • major commanders(person)/staff, combat equipment operation and maintenance personnel, etc.</td>
</tr>
<tr>
<td>Nature of work</td>
<td>Field command, combat equipment, and material equipment of lower combat system according to the operational plan.</td>
<td>Long-term, continuous, professional work such as unit establishment plan, operational plan, and all unit Formation. Combat equipment and material management tasks such as weapon system maintenance.</td>
</tr>
<tr>
<td>Service period</td>
<td>Within 30 days a year • currently, 15 days</td>
<td>Within 180 days per year</td>
</tr>
</tbody>
</table>

Note: Seol BG. A plan to establish a mobilization immediate response posture in line with roles and responsibilities. Mobilization Reserve Forces. 620, 49 (2022).

The non-standing reserve forces system calls for mobilization training for reservists and forces them to serve in the military, but so far they have not received the same benefits as active duty service members. The main limitation is that one cannot receive military pensions, four major insurances, and promotions like active duty officers. First, Article 16(1) of the Act on the Organization of the Republic of Korea Armed Forces was amended to provide, “The Republic of Korea military has military personnel in addition to the military personnel(including full-time and non-standing reservists).” If Article 48 of the Military Service Act is amended to “The service and treatment of persons enlisted in the military due to a call for military force mobilization(training) shall be the same as those of active duty,” the status as a soldier can be guaranteed just like those on active duty. If Article 2 of the Military Personnel Management Act is amended to “reserve service or supplementary service serving in the military by summoning and supporting,” reserve forces will be applied to the Military Personnel Act, which will become the basic statute that can receive benefits such as promotion and pension benefits in the future. As suggested in the 2021 by the Army Headquarters, from among officers, sergeants, and non-commissioned officers who have been retired under Article 3, Paragraph 1 Subparagraph 1-1 of the Reserve Forces Act, they are selected through a certain procedure, which will become a basic law that can be used to guarantee the service of retired executives and extend the retirement age[16].

4. Analysis of Overseas Cases: Characteristics of the U.S. Reserve Forces Service System

With the enactment of the National Defense Act in 1920, the United States had a unified organizational system that included regular forces, national defense forces, and federal reserve forces. After the Vietnam War, it shifted to the recruitment system in 1973, but to overcome the difficulties in manpower supply and demand, it began to combine the forces of the standing army and reserve forces. At the time of payment, the same level of equipment as active duty was provided. The U.S. reserve forces perform their duties in the same status as those of active duty, and are guaranteed the same salary, pension, promotion system, and social security measures. As a result, reserve forces accounted for 61.2% of the standing forces, and were deployed in Iraq and Afghanistan to successfully carry out their missions[17].
The United States is a country of a recruitment system, and active duty recruits under the Recruitment Command recruit for active duty, and full-time reserve forces (Active Guard Reserve; hereinafter “AGR”) recruits for reserve forces. The period of service is 8 years in total, and from the age of 18, one can choose active duty or reserve forces refer to <Table 2>. After 8 years of compulsory service, one can serve up to the age of 60 through the renewal of the contract. If one serves for 20 years or longer, one can receive a pension of up to 40% of one’s active duty service. Furthermore, the salary is set higher than the social life. As of 2021, the minimum annual salary of a sergeant is about 57.5 million won, and 48 million won is paid as a bonus upon enlistment. Despite such extraordinary benefits, the U.S. Army's minimum target for active duty recruitment in 2021 of 57,500 (57,606) was met, and the reserve recruiting target was 15,875, but only 11,690 were applied. Hence, in 2022, the bonus upon enlistment is said to be increased to 60 million won [18].

Table 2. Service period of active duty and reserve forces of the United States.

<table>
<thead>
<tr>
<th>Classification</th>
<th>New recruit training</th>
<th>Active duty</th>
<th>Emergency reserve forces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Selected reserve forces (AGR, TPU, IMA)</td>
</tr>
<tr>
<td>Active duty</td>
<td>-</td>
<td>2-4 years</td>
<td>4-6 years optional</td>
</tr>
<tr>
<td>Reserve forces</td>
<td>3-6 months</td>
<td>-</td>
<td>Up to 8 years optional</td>
</tr>
</tbody>
</table>

Note: Yun JW & Bae IS. A plan for fostering the reserve force experts for the advancement of reserve forces. “Implications of the Ukraine incident from the perspective of the reserve forces”, 144 (2022).

The unit organization reserve forces (TPU) are affiliated with a training command subordinate to the U.S. Army Reserve Forces Command (U.S.ARC), and all soldiers (100%) from the commander are organized as reserve forces, and they are all organized into the National Guard and Federal Reserve Forces to carry out their missions. Training is conducted for at least 39 days for at least 48 training tasks, and regular training is conducted during normal work life to maintain combat power and, if necessary, perform the mission of dispatching forces. Compared to the Korean armed forces, the mobilization support group appears to be the training command and the mobilization supplement battalion are the TPUs, but the reserve forces before the mobilization supplement battalion are the short-term non-standing reserve forces. Germany’s reserve forces are similar to the TPU. The TPU supports the reserve forces, whereas the reserve forces are formed under the standing forces and serve 10 months a year, and are trained in conjunction with the standing forces [19].

To maintain the total force, legal and institutional supplementation that treats reserve forces with the same status as active duty should take precedence. As a civilian, when they are called up in the enlisted unit, they are treated like active duty, but when they declare a general mobilization order, they are converted to active duty. The long-term non-standing reserve forces system must come up with measures to ensure the continuity and professionalism of operation to ensure that it can be operated as a two-job concept. Furthermore, it is necessary to prepare a full-time reserve forces system such as the U.S. AGR system, and to have personnel who work full-time like active duty as reserve forces. The number of Civilian Personnel in active duty units continues to increase. Unlike the active duty, Civilian Personnel are restricted from carrying firearms as civil servants and are not given combat uniforms. Active duty units want comrades who can carry guns and fight together. The full-time reserve forces of the U.S. military are reserve forces, but they carry firearms and wear combat uniforms like active duty soldiers. Because of the permanence of the profession, the professionalism increases over the years. The Korean reserve forces also need to increase their expertise by introducing the same system as the U.S.
Unlike the U.S. and German reserve forces, the non-standing service reserve forces do not have military status under the current law, and hence, they are relatively lacking in benefits such as the salary system, military pension, promotion system, and insurance system like the active duty soldiers. Furthermore, there is a disadvantage in that there is no legal basis that veterans can serve as reserve forces, and hence, the long-term continuous service is restricted, and there is a relatively lack of professionalism. To address such problems, there is a continuous demand for system improvement in the land base to ensure that veterans can serve, including reserve soldiers, in the reserve forces. The recruitment system was established by the U.S. military after about 50 years of trial and error, and in Korea, as a long-term task, many tasks such as forming a consensus among the people, improving laws and regulations, securing the budget, and reorganizing the military structure must be carried out at the same time, which requires the continuing research development.

Considering the advantages of such two types, it is also necessary to conduct a follow-up study on how to apply them to the Korean armed forces. The full-time reserve forces (AGR) are full-time reserve forces, accounting for 11.2% of reserve forces, and about 70,000 people are on duty. In the reserve forces, they are serving 24/7 together with military personnel and is a soldier with the same concept as active duty. The main task is to carry out continuous support missions such as training preparation and administration for reserve forces, equipment management, personnel management, and constant support for mobilization and dispatch. This is a form of service that the Korean armed forces do not have, and is also considered as an alternative to overcome the combat mission limitations, which is quite a disadvantage of the reserve forces military personnel. The individual mobilization reserve forces (IMA) are individually formed in the standing forces, and usually about 20 to 30 men serve in the corps. They train at least 14 days per year in muster units and master 0-48 tasks, comparable to the short-term non-standing service reserve forces of the Korean armed forces. These reserve forces (TPU, IMA) are convened for training on two weekends every month for two days, two weeks a year. During one-day training, two days’ compensation is differentially paid by rank. It is apparent that they usually receive 320,000 to 740,000 won for one day of training. The individual reserve forces (IRR), unlike the reserve forces, are unorganized and can be selected after active duty or service in the reserve forces. It can be considered similar to the reserve forces designated for mobilization by the Korean armed forces as it is organized primarily for personnel to increase and compensate for losses of the reserve forces, and conducts a one-day called in drill a year.

The U.S. military operates a system called the Active Duty Operation Support (ADOS) to support the reserve forces. They are the reserve forces that perform missions for a certain period of time through contract to support the work of the AGR in the reserve forces. Depending on the need, the contract can be signed for 1 to 365 days, up to 5 years, and during the hiring period, the same level of salary and welfare benefits as those of active duty service. When the ADOS recruitment budget is requested, the annual budget is allocated and the unit can freely contract, but in reality, there are few people who satisfy the requirements of the hiring position, and hence, it is often returned. Furthermore, most of them have jobs, and disadvantages at work can be guaranteed by the U.S. SERRA (the Military Employment and Reemployment Act). As a past case, there was a judgement rendered to pay 234 million won in damages to a company that fired a pharmacist who took leave to convene training for the reserve forces, but there are also companies that implicitly create a situation that disadvantages promotion and induces them to retire. This system is similar to Korea’s long-term non-standing service system, and when it is expanded, it seems to be a measure to improve combat power by supplementing the mobilization officer positions in the Korean military, yet follow-up studies will be needed to ensure realistic employment conditions even after legal supplements and amendments to the law.
5. Closing Remarks

While Korea’s long-term non-standing reserve forces system provided legal guarantees of working with active duty for up to 180 days, there are many legal and institutional issues that need to be supplemented in terms of the status, budget formation, and organization of the Korean reserve forces. Furthermore, while the origin and background of the U.S. reserve forces system is different from those of Korea, the following issues should be noted in developing Korea’s reserve forces system through the U.S. reserve forces system.

Firstly, the U.S. military legally and institutionally provides that reserve forces are the same as active duty, and based on the law, reserve forces and active duty are interdependent partners to perform missions and dispatch forces to areas in need in case of emergency. Secondly, the reserve forces budget is 9% of the national defense budget (about 60 trillion won), and 75 million won per year is allocated to one person of the reserve forces. The AGR system and the ADOS system are operated efficiently to ensure that the reserve forces supporting them can perform their missions immediately. Thirdly, in order to strengthen the Republic of Korea-U.S. alliance, the reserve force has been formed into units and has been operated as a military organization since peacetime. It is necessary to maintain an appropriate size of the standing force and at the same time build a strong reserve force to effectively operate the military force in case of emergency [25].

With reference to such implications, the Korean armed forces also need to improve the legal area to ensure that reserve forces could become soldiers in peacetime to improve their treatment, and to develop full-time and non-standing reserve forces systems that applied the AGR system or ADOS system to reserve forces, and develop a policy of holistic reserve forces, such as by forming a reserve force-oriented unit that trains experts and conducts regular training with the standing division. Above all, they ought to actively pursue a plan to realize the compensation cost for training reserve forces. The non-standing reserve forces service system, which is currently continuously expanding, is applied to some mobilization positions within 30 days or 180 days for some mobilization-oriented units, and it is planned to expand to 4,593 including long-term and short-term systems by 2024 [26]. However, as it is unavoidable to expand about 10 times by 2040, it is necessary to consider the expansion of the forward corps establishment unit, regional defense division, and reserve forces units in 2030 and to all reserve forces units in 2040.

In the Russo-Ukraine War, the Ukrainian citizens volunteered to conduct training and participate in the war. Regardless of age or sex, they trained with wooden guns and pushed forward with their will to resist. The wealthy purchased personal equipment with their own money and authenticated it on the social media, burning invigorating will to fight against invincibility. As seen in the current Ukraine crisis, the fighting is intensively carried out in the eastern and southern regions. If a war breaks out on the Korea Peninsula, it is likely to occur intensively in a certain area, as in Ukraine. In principle, the regional reserve forces are operated at the city, county, and district, and can be operated by switching to adjacent city, county, and district if necessary [27].

The U.S. ADOS system secures a budget in advance and lists and manages the reserve forces to ensure that the military can operate reserve forces when necessary. They are selected from among the ex-officers who have been discharged from the military, and according to individual wishes, they receive education and training for one day a year. The impact of the Ukrainian militia’s will to resist during the Russo-Ukraine war on the implementation of the national all-out war should be taken as a lesson to establish a view of security for the entire nation and to strengthen its capabilities as a last resort in the wartime [28].
Under the national total defense system, the reform of reserve force advancement is not sufficient with the resources and efforts of the Ministry of National Defense. Now is the time to focus efforts on finding ways to make the reserve force advancement by integrating the resources of each governmental ministry[29]. In the Russo-Ukraine War, the reserve forces were mobilized to carry out the war as a national all-out war, but the unprepared reserve forces were not effective. It is important for the governmental ministry reserve forces personnel and defense reserve forces personnel to have the opportunity to have job training, agenda discovery, and joint seminars together[30]. A method of organizing reserve forces-related subjects in the bachelor's course in the military department of the university, and activating the reserve force research institutes of private universities such as the Sangmyung University Defense Reserve Forces Research Institute established in April 2021 to give research service tasks. In this context, it is necessary to form a consensus and joint efforts to make the reserve force advancement by forming a government-military-academia-research reserve force innovation council.

6. References

6.1. Journal articles


6.2. Books


6.3 Additional references


7. Appendix

7.1. Author’s contribution

<table>
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<th>Initial name</th>
<th>Contribution</th>
</tr>
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<td>- Set of concepts ✔&lt;br&gt; - Design ✔&lt;br&gt; - Getting results ✔&lt;br&gt; - Analysis ✔&lt;br&gt; - Make a significant contribution to collection ✔&lt;br&gt; - Final approval of the paper ✔&lt;br&gt; - Corresponding ✔&lt;br&gt; - Play a decisive role in modification ✔&lt;br&gt; - Significant contributions to concepts, designs, practices, analysis and interpretation of data ✔&lt;br&gt; - Participants in Drafting and Revising Papers ✔&lt;br&gt; - Someone who can explain all aspects of the paper ✔</td>
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<td>IB</td>
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